

FINANCING CLIMATE SOLUTIONS AND JOB CREATION

HEARING BEFORE THE SELECT COMMITTEE ON THE CLIMATE CRISIS HOUSE OF REPRESENTATIVES ONE HUNDRED SEVENTEENTH CONGRESS

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FINANCING CLIMATE SOLUTIONS AND JOB CREATION

THURSDAY, JULY 29, 2021

U.S. HOUSE OF REPRESENTATIVES,
SELECT COMMITTEE ON THE CLIMATE CRISIS,
Washington, DC.

The committee met, pursuant to call, at 9:03 a.m., via Zoom, Hon. Kathy Castor [chairwoman of the committee] presiding.

Present: Representatives Castor, Bonamici, Brownley, Levin, Casten, Escobar, Graves, Palmer, Carter, Miller, Armstrong, Crenshaw, and Gonzalez.

Ms. CASTOR. Well, the committee will come to order.

Without objection, the chair is authorized to declare a recess of the committee at any time.

As a reminder, members participating in this hearing remotely should be visible on camera throughout the hearing. As with in-person meetings, members are responsible for controlling their own microphone. Members can be muted by staff only to avoid inadvertent background noise.

In addition, statements, documents, or motions must be submitted to the electronic repository at sccc.repository@mail.house.gov.

Finally, members or witnesses experiencing technical problems should inform the committee staff immediately.

Well, good morning, everyone. Thank you for joining this remote hearing. Today we will hear about financial incentives and investments to create jobs and accelerate deployment of clean energy and clean vehicles.

I now recognize myself right now for 5 minutes.

Well, thanks in large part to American research and innovation, we can now power our homes and cars and businesses in ways that pollute less and cost less. Solar and wind have become two of the cheapest sources of power in America, and energy efficiency saves families hundreds on their utility bills. It is now cheaper to drive an electric car than a gas-powered one, thanks to lower maintenance costs and other savings over the lifetime of a vehicle. On Tuesday, I had a chance to check out Ford's new electric pickup truck, the F-150 Lightning. I love the name, by the way. And it is an impressive vehicle. It was built by union workers right here in America. The modern wave of all sorts of clean technology will save Americans money, help create jobs as we make progress on solving the climate crisis.

And that is good news because we know that we must act urgently to reduce carbon pollution. We are already facing the growing risks and costs of the climate crisis—we go through this every

hearing—heatwaves, wildfires, extreme storms, sea-level rise that threaten the lives and livelihoods of millions of our neighbors back home. So in this committee and in Congress we have heard from scientists that America needs to reach net-zero emissions as soon as possible and no later than 2050, and we need to lead by example so that the rest of the world will join us in finding global climate solutions.

And the key to a clean economy is clean electricity. The good news is that our nation's electricity sector has reduced carbon pollution in the last decade, but the reality is that we have to do more, and we have to do it quickly. Clean electricity helps unlock further pollution cuts in other sectors of the economy, including transportation, buildings, and industry. And in order to cut U.S. carbon pollution by more than half by 2030, as President Biden pledged to the world that we will do, we need to implement climate solutions in every sector.

And that is why the Federal policies and investments that we are discussing today are so important. The Federal Government needs to help everyone, from homeowners to heads of companies. We have got to help everyone make the shift to clean technologies. We know that these clean technologies will improve the lives of our neighbors, leading to cleaner air, healthier communities, and a more sustainable economy.

Our job is to help American families and businesses make that transition, especially as so many of them are still recovering from the economic impacts of the COVID pandemic. That is why Congress must support expanded access to technologies that are already available, making them more affordable, and building on the progress that we have already made. Because while we have helped bring down the costs of climate solutions, we still have a lot of work to do when it comes to deploying them at the scale the climate crisis requires.

So that is what we are going to focus on today. We will discuss how we can use financial incentives and smart investments that can help families afford cleaner energy. We will talk about how we can accelerate the deployment of zero emission cars and trucks. And we will discuss how to create jobs in clean energy and electric vehicle manufacturing. These jobs come with high-road labor standards and family-sustaining wages. And as you will hear from one of our witnesses today, access to financing can be a critical barrier to upgrading homes for Americans. But cutting carbon pollution from houses and strengthening them to withstand the climate crisis hazards is necessary now. And we will hear about success in overcoming these barriers at the state level, and we will hear about the opportunities that a national initiative will provide to protect property, cut energy bills, and reduce pollution.

When it comes to solving the climate crisis, we need to empower everyone to take concrete steps to make a difference and ensuring that clean energy solutions provide good opportunities and that they are within reach of all Americans. I know we can do this. So now let's make it happen.

So with that, I will recognize our ranking member, Mr. Graves, for 5 minutes for an opening statement.

[The statement of Ms. Castor follows:]

Opening Statement of Chair Kathy Castor
Hearing on “Financing Climate Solutions and Job Creation”
Select Committee on the Climate Crisis
July 29, 2021

As prepared for delivery

Thanks in large part to American research and innovation, we can now power our homes, cars, and businesses in ways that pollute less and cost less. Solar and wind have become two of the cheapest sources of power in America, and energy efficiency saves families hundreds on their utility bills. It's now cheaper to drive an electric car than a gas-powered one, thanks to lower maintenance costs and other savings over the lifetime of a vehicle. On Tuesday, I had a chance to check out Ford's new electric pick-up truck, the F-150 Lightning. It's impressive—and it was built by union workers right here in America. The modern wave of all sorts of clean technologies will save Americans money, and help create jobs as we make progress on solving the climate crisis.

And that's good news—because we know we must act urgently to reduce carbon pollution. We're already facing the growing risks of the climate crisis: heatwaves, wildfires, extreme storms, and sea-level rise that threaten lives and livelihoods. In this committee and across Congress, we've heard from scientists that America needs to reach net zero emissions as soon as possible, and no later than 2050. And we need to lead by example, so the rest of the world will join us finding global solutions to global warming.

The key to a clean economy is clean electricity. The good news is our nation's electricity sector has reduced carbon pollution in the last decade. But the reality is we need them to do more—and quickly. Clean electricity helps unlock further pollution cuts in other sectors of the economy, including transportation, buildings, and industry. In order to cut U.S. carbon pollution by more than half by 2030—as President Biden has pledged to the world—we need to implement climate solutions for every economic sector.

And that's why the federal policies and investments that we're discussing today are so important. The federal government needs to help everyone—from homeowners to heads of companies—make the shift to clean technologies. We know clean technologies will better the lives of our neighbors—leading to cleaner air, healthier communities, and a more sustainable economy. Our job is to help American families and businesses make that transition, especially as many of them are still recovering from the economic impacts of the COVID pandemic. That's why Congress must support expanded access to the technologies that are already available, making them more affordable, and building on the progress we've already made. Because while we've helped bring down the costs of climate solutions, we still have a lot of work to do when it comes to deploying them at the scale the climate crisis requires.

That's what today's hearing will focus on. We'll discuss how we can use financial incentives and smart investments that can help all families afford cleaner energy. We'll talk about how we can accelerate the deployment of zero-emission cars and trucks. And we'll discuss how to create jobs in clean energy and electric vehicle manufacturing—jobs with high-road labor standards and family-sustaining wages. As you will hear from one of our witnesses today, access to financing can be a critical barrier to upgrading homes for Americans. But cutting carbon pollution from houses and strengthening them to withstand climate crisis hazards is necessary now. We'll hear about success in overcoming these barriers at the state level. And we'll hear about the opportunities that a national program will provide to protect property, cut energy bills, and reduce pollution.

When it comes to solving the climate crisis, we need to empower everyone to take concrete steps to make a difference, ensuring that clean energy solutions provide good opportunities, and that they are within reach of all Americans. I know we can do this. Now let's make it happen.

Mr. GRAVES. Thank you, Madam Chair. And I want to thank the witnesses for being here today. I look forward to your testimony.

And I really welcome this hearing this morning because we do need to look at where we are investing our precious taxpayer resources to get the best return on investment. We have got to make sure that we are incorporating more science into this discussion to ensure that the investments we are making are the most efficient

at actually reducing emissions and plotting a course, not just to a clean energy future in the United States but one that will actually result in a clean energy future globally.

I have heard many witnesses come before the committee and talk about how solar and wind are the most cheapest forms of electricity, the most inexpensive forms of electricity, yet for 30 years we have been subsidizing those forms of electricity through the ITC and the PTC. If they are the most affordable, should we be diverting those resources to other types of incentives that will actually help to reduce global emissions? And I keep making reference to global because, as we all know, this is a global problem, and there is not anything that we can do exclusively in the United States that will help to turn the corner.

The chair in her opening noted the challenges that we are experiencing in the United States. And let's be clear, there is no trajectory that we are on right now that will change or thwart that future unless there is a significant change in global emissions reductions.

The Paris Accords that have been largely celebrated actually codify an increase in global emissions. If you look, for example, just at China, which now emits more than every developed country in the world combined, under the agreement, they get to increase their emissions another 50 percent between now and 2030. That is the wrong direction.

And the reality is that our investments, our financing, our tax incentives have to be deployed in a way that is strategic and recognizes not just the reality in the United States but the global reality because you will never have an uptake in more expensive energy solutions in developing countries. You are not going to have the ability to afford those types of energy solutions. You are not going to have the exportability of those energy solutions.

We also have to recognize other facts, like the fact that global energy demand is projected to increase another 50 percent between now and 2050, just over the next 29 years. Natural gas alone is projected to have a 40 percent increase in demand over that same time period. Where is that going to come from? Where are those energy sources going to come from? Are they going to be affordable and exportable to some of these third world countries? Who is going to provide that natural gas? Is it going to be the United States that currently has a 40-plus percent lower emissions profile than Russian gas? And what role will technologies like carbon capture, storage, and utilization play, which in some cases, unfortunately, I have heard people demonize, but I think the reality is that we are going to see it probably play one of the most important roles in a clean energy future.

And that is why I am encouraged that the Biden administration has embraced it. That is why I am encouraged that entities like The Nature Conservancy, National Wildlife Federation have endorsed.

It is why I am encouraged that Senators Bennet, Duckworth, Tester, Whitehouse, Kaine, which are all Democrats, who are all Democrats, and Senator King, who is an Independent, released a statement saying we urge you to support programs that the Department of Energy develops that deploy carbon capture, utiliza-

tion, and storage technologies in partnership with the private sector.

Madam Chair, I think we have found ourselves in a scenario whereby we are often looking at solutions based on faith and emotion rather than science, economics, and facts. And I am concerned that we are going to try to squeeze that last drop of emissions out of certain sectors, whether it be transportation or energy, and the cost for that last ton is going to be so excessively expensive, and we are not going to be looking at how can we most affordably chart that clean energy future in a way that will truly receive uptake in the global community and turn the emissions trajectory we are on now in a different direction.

So, again, I look forward to hearing from our witnesses today. I welcome this hearing and yield back.

Ms. CASTOR. Okay. Now we are going to hear from our witnesses. They are all prominent leaders and researchers on financial policies that can help ensure that every American can access clean energy and drive clean vehicles.

Duanne Andrade is the Chief Financial and Strategic Officer of the Solar and Energy Loan Fund in Florida. She leads development of innovative financing programs to help low- and moderate-income Floridians make their homes more sustainable through energy efficiency, renewable energy, and climate resilience. Ms. Andrade previously worked as a consultant for startups focused on environmental justice, sustainability, and clean energy finance models.

John Larsen is a Director at Rhodium Group and leads the firm's U.S. power sector and energy systems research. He specializes in analysis of clean energy policy and market trends. Previously Mr. Larsen worked for the Department of Energy's Office of Energy Policy and Systems Analysis as an electric power Policy Advisor.

Rich Powell is the Executive Director of ClearPath, an organization whose mission is to advance clean energy innovations. Mr. Powell served as a member of the 2019 Advisory Committee to the Export Import Bank of the United States, and he is also on the Atlantic Council's Global Energy Center's Advisory Group.

And Zoe Lipman is the Director of Manufacturing and Advanced Transportation at the BlueGreen Alliance. She leads their policy and advocacy work on clean technology manufacturing and advanced vehicles and transportation. A former trade union official, she previously led the National Wildlife Federation's program on fuel economy and advanced and electric vehicles and headed the organization's Midwest climate policy program.

Without objection, the witnesses' written statements will be made part of the record.

And with that, Ms. Andrade, you are now recognized for 5 minutes to summarize your testimony.

Welcome.

STATEMENTS OF DUANNE ANDRADE, CHIEF FINANCIAL AND STRATEGIC OFFICER, SOLAR AND ENERGY LOAN FUND (SELF); JOHN LARSEN, DIRECTOR, RHODIUM GROUP; RICH POWELL, EXECUTIVE DIRECTOR, CLEARPATH; AND ZOE LIPMAN, DIRECTOR, MANUFACTURING & ADVANCED TRANSPORTATION, BLUEGREEN ALLIANCE (BGA)

STATEMENT OF DUANNE ANDRADE

Ms. ANDRADE. Thank you very much.

Good morning, Chair Castor, Ranking Member Graves, and members of the Select Committee. It is a great honor for me to be with you here today in this important hearing. My name is Duanne Andrade, and I am the Chief Financial and Strategic Officer for Florida's green bank, the Solar and Energy Loan Fund, known also as SELF.

The Select Committee is already well informed on the science behind the climate crisis, so today I would like to focus on why we need to invest in clean energy and resilience, how SELF is doing this despite scarce resources, and what we need to do so we can scale and benefit communities in an equitable and sustainable way across America.

SELF is a nonprofit Community Development Financial Institution known as the CDFI. We are also a founding member of the American Green Bank Consortium, we are based in Florida and have pilot programs in South Carolina, Alabama, and in a few weeks we are going to be opening up Georgia, next Tennessee, and Texas.

Our mission is to provide access to affordable financing for sustainable property improvements, which means basically making unsecured loans for clean energy and climate resilient improvements to low- and moderate-income populations with low credit scores, basically high efficiency ACs, fortified roofs, impact windows and doors, solar, battery storage, and more.

SELF has a 10-year track record serving LMI homeowners with unsecured loans based on ability to repay not credit scores. LMI populations have typically lower credit scores and are perceived as subprime, which connotes high risk in the traditional financing system. And it makes them less likely to access affordable financing and makes them vulnerable to predatory lenders.

SELF has grown by 400 percent over the last 3 years and completed over 2,100 sustainable home improvements totaling over \$19 million, and 73 percent of our loans have been to LMI homeowners with low credit scores mostly, and our average default rate is less than 2 percent. SELF's success bears testament to the demand for climate resiliency and proof of the creditworthiness of LMI households. LMI households make up about 40 percent of American households. They tend to live in older housing with outdated building standards which often lead to higher energy burdens and higher insurance rates, if they can afford that at all. Due to low credit scores, they also lack access to affordable capital to make energy efficiency and climate resiliency improvements that would reduce energy costs, climate risks, and also carbon emissions.

According to a recent study, 32 million homes in America are at risk from hurricanes alone. This makes me think of our client,

Alice, a 62-year old woman with a serious spinal disease who lives on fixed income. Her roof was caving in and she was about to lose her insurance right before hurricane season. Because of her medical bills, her credit was low and she had been denied access to fix her roof and retain insurance. She did not qualify for traditional financing.

So one of our contractors referred her to us, and we were able to finance a new roof. She was able to secure insurance. She was able to secure the only and probably most valuable asset that she has, which is her home. Alice said, quote, “SELF helped me save my home,” end quote.

Another client, Joe, is a combat-wounded veteran who told SELF that his kids were suffering in the sweltering heat of Florida last summer when his AC went out. It seems like something so quotidian, so normal. However, it is life-changing, and it has huge health impacts. He couldn’t get a loan, not even from the VA. So a contractor referred him to us, and we were able to give him a small unsecured loan to get a new AC, providing quality of life and energy efficiency.

SELF has over 700 approved contractors in our networks. We use our financing to create more business. They have told us that without SELF they would lose anywhere between 20 to 40 percent of business due to clients lacking access to financing. One of our contractors, Sea Coast, has done more than a million dollars in projects.

At SELF we get constant inquiries from other states, cities, and organizations asking us to bring our services to their communities. The demand is there. What we are missing is sufficient capital to meet all the demand. SELF and other green banks across the nation are innovative and specialize in bridging financing gaps. Collectively we have decades of experience underwriting energy savings, climate risk, and energy efficiency.

Funding an independent nonprofit accelerator would have a large impact, much more than its initial capitalization from Congress, because green banks can leverage private capital up to eight times. For example, with \$100 billion in the accelerator, we could generate \$880 billion in total investments the first 5 years and create up to 5.5 million jobs. This is why we need Congress to fund an independent accelerator, to do just that, accelerate equitable investments to build more resilient communities while fostering sustainable jobs and transitioning to clean energy economy.

Thank you very much.

[The statement of Ms. Andrade follows:]

Testimony of Duanne Andrade

CFO of the Florida Solar & Energy Loan Fund

Before the House Select Committee on the Climate Crisis

Hearing on Financing Climate Solutions and Job Creation

July 29, 2021

Chair Castor, Ranking Member Graves, and Members of the Select Committee, it is a pleasure to be here with you today for this important hearing. My name is Duanne Andrade, and I am the Chief Financial and Strategic Officer of Florida’s green bank, the Solar & Energy Loan Fund (SELF). I am here today as a witness

to the benefits that can be achieved through the passage of House Bill H.R. 806, the Clean Energy & Sustainability Accelerator Act.

I want to begin by thanking Chair Castor and the Select Committee on the Climate Crisis for bringing forth this discussion. This Select Committee is already well-informed on the science behind the climate crisis, so today I will focus on how we can tackle the issue and create green jobs with the power of low-cost, long term capital through a Clean Energy & Sustainability Accelerator.

The Clean Energy & Sustainability Accelerator Act (Accelerator) is a bipartisan bill that would create an independent nonprofit Accelerator to function as a national green bank. The Accelerator bill is led by Michigan Representative Debbie Dingell, and is supported by a group of Members from both parties, including Representatives Don Young from Alaska and Brian Fitzpatrick from Pennsylvania. The Accelerator would invest in existing state and local green banks, fund the creation of green banks in states where they do not yet exist, and participate in project finance for large projects of national significance.

A fully funded Accelerator would catalyze hundreds of billions of dollars in investments by leveraging public, private, and philanthropic sources to create sustainable jobs; resilient, efficient, and affordable low-emissions housing; and clean transportation. The Accelerator bill has passed the House three times now: twice last year in the Moving Forward Act and the Clean Energy Jobs and Innovation Act and again this year in the Invest in America Act. The Accelerator was also included in the recent Democratic Senate budget resolution framework.

My organization, the Solar Energy and Loan Fund, and the constituents we serve, would directly benefit from creation of this Accelerator.

The Solar Energy and Loan Fund (SELF)

SELF is a Treasury certified, non-profit Community Development Financial Institution (CDFI), and a founding member of the American Green Bank Consortium. SELF is based out of Fort Pierce, Florida, with additional Florida offices in St. Petersburg, Hillsborough County, and Orange County. Also, SELF is opening an office in Atlanta, Georgia, has pilot programs in South Carolina and Alabama, and is soon expanding into Texas and Tennessee. SELF has a ten-year track record serving low to moderate income (LMI) homeowners with small unsecured loans based on ability to repay rather than credit scores. To date, SELF has deployed nearly \$19 million in over 2,100 unsecured loans to a majority LMI homeowners with low-credit scores, with a less than 2% default rate.

SELF's mission is to **rebuild and empower** underserved communities by providing access to affordable and innovative financing for sustainable property improvements, with a primary focus on energy efficiency, renewable energy, and climate resilience in low-to-moderate income communities. SELF pursues its mission by making **unsecured** loans to finance these improvements. An unsecured loan means that the borrower does not face the threat of confiscation of their home or other assets if they fail to repay the loan.

SELF underwrites these loans based on the customer's **ability to repay, not their credit score**. A typical loan size is approximately \$10,000 with a 5- to 7-year term. The most common home improvement projects are high efficiency air conditioners, roofs, impact windows, hurricane shutters, and solar rooftop PV systems.

SELF believes that our current lending system does not work well for those who need credit the most. LMI households account for 42% of all U.S. households. Working class Americans frequently have low wealth and low credit scores, which investors refer to as "sub-prime" to connote "high risk". The traditional financial system assesses risk by looking at credit scores, rather than the ability to repay. Credit scores and traditional underwriting methods frequently do not capture true creditworthiness of underbanked and LMI clients. Therefore, there are huge opportunities to serve these markets, delivering economic, social, and environmental benefits. The biggest barrier to serving these markets, however, is the lack of low-cost, flexible capital.

This LMI population that SELF serves is referred to by United Way as "ALICE": Asset Limited, Income Constrained, Employed.¹ ALICE Americans are not wealthy enough to access fair-priced capital, but not poor enough to benefit from most grant or subsidy programs. While they might hold a mortgage, pay their taxes, and always meet their bills on time, they cannot afford the upfront costs of residential energy efficiency and climate resilience retrofits, and their low credit scores prohibit them from borrowing at affordable rates.

We are proud of the progress that we have made over the past 10 years and especially our growth in recent years. However, the stark truth is that we are not doing

¹ <https://www.unitedforalice.org/>

enough. In our home state of Florida, there are 7.7 million households, of which 33% are ALICE.² That means there are approximately 2.5 million households in Florida that live above the federal poverty line but cannot afford the investment to make their homes cheaper to run and safer from storms. All these homes could benefit from the flexible, low-cost capital that SELF provides.

The lack of access to affordable credit to build, improve, and protect assets exacerbates climate risks, leaving LMI communities more exposed than anyone else to climate events. This exposure creates a heavy “climate burden”—meaning additional costs (insurance, energy, capital) and risks associated with climate events that threaten their only assets: their homes; their health; and their ability to be productive. Climate resilience upgrades include energy efficiency; insulation and weatherization; high-efficiency air conditioners and heaters; solar energy with battery storage; and fortified roofs, impact windows and hurricane shutters. These upgrades help residents save money to repay the investments, but even more importantly, they greatly improve quality of life, health, and safety when faced with climate or health threats as we experienced during the Covid-19 Pandemic.

In 2020, amidst the Covid-19 pandemic, SELF’s overall lending activity increased by 84% and surpassed \$5 million annually for the first time. SELF has now grown by 400% over the last three years and financed over 2,000 sustainable home improvement projects totaling \$19 million in **unsecured loans**, with 74% of the lending activity in underserved markets.

Jobs

From an economic stimulus perspective, SELF helps large and small, local, minority-owned contractors do work in underserved communities—often their own—by offering a financing tool that will fit the needs of LMI homeowners. Developers benefit from access to SELF’s low-cost Housing Impact funds that provide low-cost capital to complete capital stacks that incorporate “green” (climate resiliency, energy efficiency, and solar and battery storage) building standards to benefit low income rental tenants. This latter product is one that there is an increasing demand for.

By financing improvements in communities with no affordable alternative, SELF opens up a new market for contractors who would otherwise be shut out of helping this portion of America. **This translates to more business and more jobs.** SELF’s contractors have expressed that without SELF, they lose anywhere between 20 to 40 percent of business due to lack of financing available for LMI clients. SELF has over 700 vetted and approved contractors in our network, and is always adding more as we find more capital to lend.

When contractors sign up for SELF’s network, they are able to do business in new markets without taking any financial risk, which allows them to expand their businesses to support new jobs. One of SELF’s approved contractors, Westfall Roofing, said in a recent interview: *“There’s not a lot of options like SELF out there, I’ll tell you that. There’s a lot of financing companies in the home-improvement industry, but they all have pretty similar restrictions and guidelines where SELF is able to give options to homeowners when they’re getting declined everywhere else.”*³

One local Ft. Pierce family-owned business, Sea Coast Air Conditioning, has done over \$1 million in projects with SELF financing. He said: *“We did the math on it this morning,” Zack Langel said. “We have done a little over 200 systems through SELF (and) have never once had a problem.”*⁴

A female-owned minority contractor in Orange County, Florida, was thrilled when she found out about SELF. She said, “(SELF) is a very ethical company. They explain everything very well to the homeowner. We were looking for a financing company that could help homeowners that are struggling.”⁵

SELF’s contractors are eager to find more financing for projects that are awaiting capital, especially in disadvantaged communities. In Florida, contractors are keenly aware that thousands of LMI homeowners are losing insurance coverage due to outdated roofs, windows, and doors. Insurance companies are no longer willing to underwrite climate risks unless homes are upgraded. To address this issue, accessible, low cost, and flexible capital for climate resilience is needed, especially for disadvantaged communities so that LMI homeowners and small landlords of low-income housing are able to access insurance coverage and protect their assets.

² https://www.hfuw.org/wp-content/uploads/2020/05/2020ALICEHighlightsReport_FL_FINAL-4.15.20.pdf

³ <https://www.theinvadingsea.com/2021/07/12/steve-sowers-the-solar-and-energy-loan-fund-enables-low-income-property-owners-to-get-loans-for-roofing-work/>

⁴ <https://www.wptv.com/rebound/self-helps-struggling-homeowners-avoid-sweating-over-ac-payments>

⁵ <https://www.youtube.com/watch?v=m07ghVYZdUs&t=165s>

The Case for the Accelerator

As extreme temperatures become more common and severe weather events more frequent, homes use more energy and sustain more threats to their structural integrity. This year, hurricane seasons for Florida and the Southeastern United States began in May, a month earlier than usual. This week, we're seeing how a heat wave across Texas leads people to stay safe by cranking their inefficient AC units, straining the system so much that the state's grid manager has warned of potentially record-breaking electricity demand.⁶

In Florida, we're seeing how the home insurance markets will respond to worsening climate events. Just weeks before the 2021 hurricane season began, property insurance companies used the excuse of insufficient storm resilience to justify dropping over 50,000 Floridians from their homeowner policies.⁷ Close to a third of American families have zero or negative net home wealth.⁸ This means that close to a third of America is at risk of losing their sole asset to climate change-related severe weather events. The loss of insurance protection placed over 50,000 Floridians at risk of losing the only asset they might pass on as generational wealth. **With help from the Accelerator, SELF will provide the upfront capital for climate resilience improvements, so Americans in climate-vulnerable regions can live safely, maintain their insurance policies, and pass along the full wealth of their home to future generations.**

How can LMI homeowners ensure their health and quality of life during these extreme weather events, while also reducing broader power outage risks? In the case of Texas, who will finance energy efficiency improvements that help make these homes less of a strain on the power grid and more affordable for the residents to operate on a regular basis? In Florida, who will finance wind-resistant roofs, impact windows, and doors so the average American homeowner can protect their homes and keep their insurance?

Capital from an Accelerator would help SELF greatly expand existing LMI lending programs and would enable us to provide longer-term financing options (e.g., 10–20 years) to further advance the affordability of projects like rooftop solar PV plus battery storage. The longer-term loans would stretch out the repayment term and therefore lower monthly loan payments. Energy and insurance savings derived from these projects also help pay for the loans over time.

SELF and other green banks across the nation specialize in filling financing gaps and have decades of experience underwriting energy savings, climate risk, and energy efficiency. Green banks are innovative and nimble and exist to find financing solutions to climate issues that have been left out of the traditional financing system. Green banks have successful track records, manage funds prudently with triple bottom line returns: financial, social and environmental.

Funding for an independent Accelerator would have a much larger real-world impact than its initial capitalization from Congress because it would fund green banks that leverage private capital, recycle their own capital for repeat investment of the same dollars, and can borrow private capital. An Accelerator has a multiplier effect on total real-world investment in sustainability and resilience. **For example, with \$100 billion of funding, the Accelerator would generate \$880 billion of total investment and would create 5.5 million jobs in its first five years of operations.**⁹ You can learn more about the impact of the Accelerator in the document referenced in the footnote¹⁰ below.

SELF believes that capitalizing Green Banks will greatly help respond to these needs and that is why we need to have a federally funded Accelerator. In particular, I'd like to call your attention to a few of the key benefits of having the Accelerator funded as an independent nonprofit (as envisioned in Rep. Dingell's bill) which could not be achieved if the Accelerator is a federal government program:

- *Speed:* An independent nonprofit Accelerator would be able to move with alacrity, funding projects within weeks of establishment rather than a lengthy rule-making process.

⁶ https://www.bloomberg.com/news/articles/2021-07-23/-dome-of-doom-will-bake-texas-and-central-u-s-next-week?fbclid=IwAR0Ds3qgscxSn96bg6Kmn41l_kcV5H0fdPr9mYySVK-LSPy8gH3gz8Igk

⁷ <https://www.clickorlando.com/news/local/2021/05/24/property-insurance-companies-drop-50000-florida-policy-holders-ahead-of-hurricane-season/>

⁸ https://www.db.com/newsroom_news/inequality_Jan2018.pdf

⁹ <https://coalitionforgreencapital.com/wp-content/uploads/Accelerator-Impact-Vivid-Economics-11.22.20.pdf>

¹⁰ <https://>

does.google.com/presentation/d/1E8Cxfm2dw1eigDkyQnnwzGwqG19xEIXTRBdZGUYmVA/edit#slide=id

- *Alignment:* An independent nonprofit would allow for the measuring and direction necessary to achieve specific policy goals set forward in legislation, most notably ensuring that 40% of Accelerator investment is directed to disadvantaged communities.
- *Impact:* Only an independent nonprofit would be able to maximize the impact of public funding by leveraging its balance sheet to access additional private sector capital; an independent, nonprofit Accelerator could also recycle its capital as principal and interest from loans are repaid to the organization.
- *Standardization:* An independent nonprofit Accelerator would allow for standardization of critical metrics and lending documents, which would eventually allow for securitization of state and local green bank loans, providing further liquidity into clean energy financing markets.
- *Savings:* An independent nonprofit Accelerator would be able to reduce operating expenses by offering centralized services such as underwriting or marketing to state and local green banks like ours.
- *Cost reduction:* According to a recent study by the NRDC and the Medical Society Consortium on Climate and Health, the total economic cost of the health impact of climate change and continued and fossil fuel air pollution exceeds \$820 billion each year in America.¹¹

There is enormous demand for the type of capital offered through the Accelerator. At SELF we get weekly inquiries from other states, cities and organizations asking us to take our services to their communities seeking to replicate our inclusive green financing model to help LMI homeowners. SELF is currently actively working with groups in South Carolina, North Carolina, Alabama, Georgia, Tennessee, Texas and Louisiana to try and take existing loan programs for LMI and create new customized loan programs to address specific locational needs.

Funding from the Accelerator would enable SELF to make energy efficiency and clean energy upgrades that would help **improve the lives of LMI households across the country**. A report from the U.S. Department of Energy's National Renewable Energy Laboratory (NREL) states:

*"Pairing solar photovoltaics with rooftops of low and moderate-income housing represents an opportunity to help modernize the U.S. electric grid and improve energy affordability in low-income communities. Understanding the potential size of the LMI market in detail offers new insights and opportunities to serve these communities," Mooney said. "The potential electric bill savings from the adoption of rooftop solar would have a greater material impact on low-income households compared to their high-income counterparts."*¹²

In conclusion, in order to fully realize the economic, resilience, and climate benefits that the services SELF and other state entities offer to people in need, the Accelerator will be crucial.

Thank you for the opportunity to testify today before this committee, and I look forward to answering your questions and discussing this policy.

¹¹ <https://morningconsult.com/opinions/before-another-deadly-summer-congress-must-act-to-address-the-rising-costs-of-climate-change/>

¹² NREL, "Low- and Moderate-Income Residences Can Help Modernize the U.S. Electric Grid," April 25, 2018, see <https://www.nrel.gov/news/program/2018/lmi-residences-can-help-modernize-us-electric-grid.html>

Appendix

Client Testimonials:

Marine Combat Engineer Joe Hill: High Efficiency Air Conditioner



Pamela Turner: Roof Loan (Resilience)



Pamela Turner is a U.S. veteran, single-mother of four small children, and cancer-survivor, who works three jobs to try and make ends meet! Unfortunately, a large portion of her roof collapsed and she did not have the savings to pay for a new roof or have the credit score needed to qualify for a traditional loan. Pamela and her family were forced to suffer the consequences and she resorted to using dozens of buckets throughout her two-bedroom home to collect water seeping through the roof. Her home was deteriorating rapidly before her eyes and it was now unsafe and unhealthy for her and her children. She had a “**major problem**” on her hands and she said she “**felt defeated**”. Pamela learned of SELF and applied for a loan based on ability to repay. She was approved for SELF’s lowest interest rate (5%), which is available to veterans and women with poor credit. She now has a solid metal roof on her home, and her family is safer, the home is healthier, and her largest asset is now protected. Pamela also qualifies for home insurance again, with lower premiums, and she will rebuild her credit as she pays off the SELF roof loan.

Alice Munster Testimonial



Alice Munster, 62, stands in front of her Port St. Lucie home on Thursday, March 11, 2021, as a crew prepare to replace the shingles on her home she and her husband have lived in for 30 years. Financing for the new roof was made possible by Solar Energy Loan Fund, a local nonprofit lender to St. Lucie County residents that provides low cost, unsecured micro loans based on an individuals ability to pay rather than credit scores or income. *PATRICK DOVE/TCPALM*

A 62-year-old with a degenerative spinal disease, Munster said she's almost lost her house twice due to financial hardships. She's been living on a fixed-income for about the past nine years while her husband Michael works at a local grocery store.

"They don't treat you like you're asking for a handout. They (SELF) have helped save my home."—Alice Munster

<https://www.tcpalm.com/story/news/2021/03/11/fort-pierce-nonprofit-helping-disabled-homeowners-veterans-communities-color/4594405001/>

Ms. CASTOR. Thank you very much.

Next we will go to Mr. Larsen. You are now recognized for 5 minutes. Welcome.

STATEMENT OF JOHN LARSEN

Mr. LARSEN. Thank you, Chair Castor. Thank you, Ranking Member Graves, and members of the committee for inviting me to speak today.

My name is John Larsen. I am a Director at Rhodium Group, an independent research firm whose research informs decisionmakers in the public, private, and philanthropic sectors. I lead Rhodium Group's U.S. energy systems research where we focus on analyzing clean energy policies, emerging clean technologies, and market trends. I am also a Nonresident Senior Associate in the Energy Security and Climate Change Program at the Center for Strategic and International Studies.

I appreciate the opportunity to speak with you today about how Congress can create financial incentives and investments to accel-

erate clean energy technologies and create good-paying jobs. To tackle the challenge of climate change, the U.S. needs to rapidly deploy clean energy technologies across the energy system and quickly cut carbon pollution.

There are a variety of policies that can accelerate this transition. Recent Rhodium research shows that updating and enhancing clean energy tax credits have the potential to increase the average annual rate of wind and solar installations on the grid by more than double last year's record of 30 gigawatts.

An enhanced clean energy tax credit framework can drive electric power CO₂ emissions down as much as 73 percent compared to 2005 levels and save or create up to 600,000 jobs on an annual average basis. All of this can be done with little impact on national average electric bills while also cutting harmful SO₂ and nox pollution in half from today's levels in just 5 years.

While electric power CO₂ emissions have dropped in the U.S. by 40 percent since 2005, our research shows that under current policy, including the current tax credit regime, this progress will stall out in the next few years. At best, the electric power sector maintains emissions in the range of 46 to 50 percent below 2005 levels in 2030 without new Federal action.

Modernizing clean energy tax credits a decade ahead can cut U.S. electric power CO₂ emissions to 64 to 73 percent below 2005 levels by 2031. This is up to eight times more emission reductions than simply extending the current clean energy tax credit framework.

To achieve these outcomes, Rhodium Group identified five critical improvements to the current tax credit framework. They are as follows: Number one, first extend the investment tax credit, the ITC, and the production tax credit, the PTC, over a long term period, such as 10 years.

Two, increase the value of the tax credits back to their initial levels, 30 percent of project costs for the ITC and \$25 a megawatt hour for the PTC. While these first two points are essential, alone they cut U.S. electric power emissions down to as low as 55 percent below 2005 levels in 2031. Adding more enhancements can amplify these productions.

Number three, if you provide flexibility to allow developers of any clean generating technology to claim the ITC or PTC, whichever makes sense for them, that will also accelerate deployment of clean technologies.

And, number four, providing a direct pay provision or refundability provision to prevent financing bottlenecks will be important to avoid constraining clean energy deployment.

All four of these enhancements together can drive emissions down to as low as 61 percent below 2005 levels in 2031. But the U.S. can double these gains again by including a fifth enhancement, incentivizing existing clean energy resources to stay on the grid. Retaining economically distressed existing clean generation, such as nuclear plants, helps to make sure that all new clean energy additions to the U.S. grid, such as wind and solar, only displace uncontrolled fossil generation and accelerate progress towards meeting clean energy goals.

These five enhancements combined can slash emissions and save or create hundreds of thousands of jobs. Even after accounting for declines in fossil fuel jobs, enhanced tax credits can create or retain up to 600,000 jobs on an annual average basis from 2022 through 2031. Clean energy tax credits have the potential to establish renewable energy. It's the largest energy sector employer in America over the next decade, surpassing the oil industry and the natural gas industry.

Enhanced tax credits can also serve as a foundation to complement other policy actions, such as a clean electric standard or pollution regulations. Congress can also tailor tax credits to help achieve other policy goals, such as supporting emerging clean technologies and directing investment toward disadvantaged communities.

Rhodium Group recently published research that also explores how tax credits can accelerate clean energy deployment in the transportation sector and in the industrial sectors of the energy system.

Thank you again for the opportunity to testify today. I look forward to your questions about our research and findings.

[The statement of Mr. Larsen follows:]

July 29, 2021

**Statement of John Larsen
Director, Rhodium Group**

**Presented to: House Select Committee on the Climate Crisis
Hearing on "Financing Climate Solutions and Job Creation"**

Thank you Chair Castor, Ranking Member Graves, and members of the Committee for inviting me to speak today.

My name is John Larsen, and I am a director at Rhodium Group, an independent research firm whose research informs decision-makers in the public, private, and philanthropic sectors. I lead Rhodium Group's U.S. energy systems research, where we focus on analyzing clean energy policies, emerging clean technologies, and market trends. I am also a non-resident senior associate in the energy security and climate change program at the Center for Strategic and International Studies.

I appreciate the opportunity to speak with you today about how Congress can create financial incentives and investments to accelerate clean energy technologies and create good-paying jobs. To tackle the challenge of climate change, the U.S. needs to rapidly deploy clean energy technologies across the energy system and quickly cut carbon pollution. There are a variety of policies that can accelerate this transition. Recent Rhodium research shows that updating and enhancing clean energy tax credits have the potential to increase the average annual rate of wind and solar installations on the grid by more than double last year's record of 30 gigawatts. An enhanced clean energy tax credit framework can drive electric power CO₂ emissions down as much as 73% compared to 2005 levels and save or create up to 600,000 jobs on an annual average basis. All this can be done with little impact on national average electric bills while cutting harmful SO₂ and NO_x pollution in half from today's levels in just five years.

While electric power CO₂ emissions have dropped in the U.S. by 40% since 2005, our research shows that under current policy, including the current tax credit regime, this progress will stall out in the next few years. At best, the electric power sector maintains emissions in the range of 46%–50% below 2005 levels in 2030 without new federal action.¹

¹(Larsen, King, Kolus, & Herndon, Pathways to Build Back Better: Investing in 100% Clean Electricity, 2021)

Modernizing clean energy tax credits for the decade ahead can cut U.S. electric power sector CO₂ emissions to 64–73% below 2005 levels in 2031.² This is up to eight times more emission reductions than simply extending the current clean energy tax credit framework. To achieve these outcomes, Rhodium Group identified five critical improvements to the current tax credit framework. They are:

- One, extend the investment tax credit (ITC) and production tax credit (PTC) over a long-term period, such as ten years.
- Two, increase the value of tax credits back to their initial levels of 30% of project costs for the ITC and \$25/megawatt hour for the PTC.

While these first two points are essential, alone, they cut U.S. electric power emissions down to as low as 55% below 2005 levels in 2031. Adding more enhancements can amplify these reductions.

- Three, provide flexibility to allow developers of any clean generating technology to claim the ITC or PTC, whichever makes the most sense in each situation.
- Four, provide a direct pay or refundability provision to prevent financing bottlenecks that could constrain clean energy deployment.

All four of these enhancements together can drive emissions down to as low as 61% below 2005 levels in 2031.

- The U.S. can double these gains by including a fifth enhancement: incentivizing existing clean energy resources to stay on the grid. Retaining economically distressed existing clean generators such as nuclear plants helps to make sure that all new clean energy additions to the U.S. grid only displace uncontrolled fossil generation, accelerating progress towards clean energy goals.

These five enhancements combined can slash emissions and save or create hundreds of thousands of jobs. Even after accounting for declines in fossil fuel jobs, enhanced tax credits can create or retain up to 600,000 jobs on an annual average basis from 2022 through 2031. Clean energy tax credits have the potential to establish renewable energy as the largest energy sector employer in America over the next decade, surpassing oil and natural gas.³ Enhanced tax credits can also serve as a foundation to complement other policy actions such as a clean electricity standard and pollution regulations. Congress can also tailor tax credits to help achieve other policy goals, such as supporting emerging clean technologies and directing investment toward disadvantaged communities.

Rhodium Group recently published research that explores how tax credits can accelerate clean energy deployment in the transportation⁴ and industrial⁵ sectors of the energy system as well. Thank you again for the opportunity to testify today. I look forward to your questions about our research and findings.

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Ms. CASTOR. Thank you very much.

Next up, Mr. Powell, you are recognized for 5 minutes. Welcome.

²(Larsen, King, Kolus, Dasari, & Herndon, Pathways to Build Back Better: Maximizing Clean Energy Tax Credits, 2021)

³(Larsen, Mohan, & Houser, Pathways to Build Back Better: Jobs from Investing in Clean Electricity, 2021)

⁴(Larsen, King, Kolus, & Wimberger, Pathways to Build Back Better: Investing in Transportation Decarbonization, 2021)

⁵(Larsen, King, Hiltbrand, & Herndon, Capturing the Moment: Carbon Capture in the American Jobs Plan, 2021)

STATEMENT OF RICH POWELL

Mr. POWELL. Good morning, Chair Castor, Ranking Member Graves, and members of the Select Committee. My name is Rich Powell. I lead ClearPath.

ClearPath advances policies that accelerate breakthrough innovations that reduce emissions in the energy and industrial sectors. An important note, we are supported by philanthropy, not industry.

Climate change is real and industrial activity around the globe is the dominant contributor. I believe the challenge it poses to society merits significant action at every level of government and the private sector. Lawmakers and businesses across the country are prioritizing investments in climate solutions. Florida established a fund providing up to \$100 million annually for climate resiliency projects, and Louisiana has a \$50 billion coastal master plan.

Since 1980, the United States has spent \$1.9 trillion in disaster recovery from 290 separate billion dollar events. If we don't better prepare, we will massively deepen deficit spending.

As the committee looks at Federal incentives for clean energy, I will discuss five key points: First, a portfolio approach to clean energy innovation; second, the 45Q tax incentive for carbon capture; third, opportunities for enhancing 45Q; fourth, the new Energy Sector Innovation Credit; and, finally, building on the bipartisan clean energy innovation record.

While the U.S. and a few others have reversed emissions trajectories, much of the rest of the world is growing their emissions as they grow their populations, industries, and quality of life. We need an American innovation-focused approach to solving the global climate challenge. There is no tax or domestic regulation that will magically halt emissions around the world. We must focus on strengthening the American economy, not ceding ground to Russia and China.

Reducing American emissions is essential, and we have seen a significant decline already. But even if the U.S. somehow eliminated all of its carbon emissions tomorrow, just the growth in emissions from today through 2050 by developing Asian countries would exceed total U.S. emissions today.

Why? Clean technology available today is simply not up to the task of global economy-wide decarbonization, which is why we need to focus on breakthroughs that offer both better performance and lower costs.

If Congress leads with an innovation-focused agenda, we can guide basic and applied R&D for clean energy innovation through to commercialization. America will lead in creating jobs, reestablishing global leadership, and driving down global emissions.

To do this, we will first need to drive down the cost of clean energy. Smart tax incentive policy has a proven record from natural gas to wind and solar. Carbon capture remains one of the most promising clean energy technologies. The Intergovernmental Panel on Climate Change and the International Energy Agency have stated that carbon capture and storage is essential to achieving net-zero emissions.

The Federal carbon capture tax credit, affectionately known as 45Q, is viewed as the single most useful tool in spurring carbon

capture project development. Most recently, a 2-year extension of 45Q was passed as part of the Energy Act of 2020.

Recent modeling from the Rhodium Group, and I am delighted to be here with John today, determined a permanent extension generated gigatons of emissions reductions and new investments in both the power and industrial sectors. Their analysis found benefits up to 157,000 job years by 2035, 52 gigawatts of power sector carbon capture deployment by 2050, deployment on industrial facilities in more than 30 states, and 4 gigatons of emission reductions by 2050 across both power and industry.

Expanding and extending 45Q is an idea that has been led on by Republicans, most notably in Leader McCarthy's energy innovation agenda launched this year, and is gaining bipartisan appeal due to the environmental benefits. Currently there are a variety of bipartisan proposals that could enable widespread deployment.

A recent National Petroleum Council report highlighted the 45Q extension and significant expansion, in line with Leader McCarthy's expanded bill of earlier this year, could incentivize an additional 350 to 400 million tons per year of carbon capture capacity, bringing the total U.S. capacity to 500 million tons per year.

One reason 45Q is so effective, it incentivizes emissions reductions in both the power sector and heavy industrial processes, like cement and chemicals manufacturing, and the transportation fuel sectors, unlike renewable energy tax credits for the power sector alone.

Going beyond carbon capture, Ways and Means members just this Tuesday introduced the Energy Sector Innovation Credit, or ESIC, a bipartisan energy tax proposal to encourage innovation in the clean energy sector. A companion bill was also introduced in the Senate. ESIC creates incentives for breakthrough innovation, for power generation, and storage technologies, a game-changing market signal for private sector innovators. It also includes a clean hydrogen production credit. ESIC will help rapidly scale and diversify clean energy technologies through innovation to achieve long-term emissions targets, create jobs, and provide safe and reliable energy.

For each breakthrough, the incentive automatically ramps down as technologies commercialize, not an arbitrary date like traditional energy credits. The credit could incentivize gigawatts of new clean generation, including for advanced nuclear, enhanced geothermal systems, offshore wind, long-duration storage, and next generation solar.

As you craft this agenda—and I cannot emphasize this enough—partisan climate policy is not sustainable. It results in short-term uncertainty and does not provide the market signals we need to move to a clean energy economy. We can start by building on recent bipartisan wins. If you pair bipartisan efforts like the Energy Act of 2020 with tax incentive policy like 45Q and ESIC, Congress will send an undeniable message that lawmakers are serious about leading on clean, reliable energy breakthroughs.

Thank you for this opportunity. We applaud the Select Committee for taking on this important task.

[The statement of Mr. Powell follows:]

Testimony of Richard J. Powell
Executive Director, ClearPath Inc.
U.S. House Select Committee on the Climate Crisis
Financing Climate Solutions and Job Creation
Thursday, July 29, 2021

Good morning Chair Castor, Ranking Member Graves and Members of the Select Committee. My name is Rich Powell, and I am the Executive Director of ClearPath.

ClearPath is a 501(c)(3) organization whose mission is to develop and advance policies that accelerate breakthrough innovations that reduce emissions in the energy and industrial sectors. We develop cutting-edge policy solutions on clean energy and industrial innovation, and we collaborate with public and private sector stakeholders on innovations in nuclear energy, carbon capture, hydropower, natural gas, geothermal, energy storage, and heavy industry to enable private-sector deployment of critical technologies. An important note: we are supported by philanthropy, not industry.

Climate change is real and industrial activity around the globe is the dominant contributor to it. I believe the challenge it poses to society merits significant action at every level of government and the private sector.

Lawmakers and businesses across the country are prioritizing investments in climate change mitigation and adaptation. Governor DeSantis of Florida, for example, has signed legislation requiring a master plan for the state to deal with sea level rise and flooding, and established a fund providing up to \$100 million annually for climate resiliency projects.¹ Meanwhile, Louisiana has a \$50 billion coastal master plan for coastal restoration in part due to rising sea levels.²

Since 1980, the United States has spent \$1.9 trillion in Disaster Recovery from 290 “billion-dollar events.”³ From 2014 to 2018, the United States has seen an annual average of 13 billion-dollar disasters. If we don’t better prepare—both with smarter investments in adaptation and by mitigating the underlying problem with global clean energy solutions—we will massively deepen deficit spending. Federal incentives for clean energy innovation have already, and should continue to, play a major role in that effort.

As the Committee looks at the role federal incentives play in climate change solutions, I will discuss five key topics today:

- **A portfolio approach to clean energy innovation.** An innovation-first agenda is the best way to solve the global climate challenge by scaling up clean energy technology so the developing world chooses clean energy as an affordable option.
- **The 45Q tax incentive for carbon capture.** 45Q was expanded in 2018 through the FUTURE Act, and was extended recently as part of the bipartisan Energy Act of 2020. It will play a huge role in carbon emissions reductions in the U.S., private sector investment, job creation and deployment across the United States.
- **Enhancing 45Q.** Republican Leader Kevin McCarthy (R-CA) recently launched a clean energy innovation agenda, which among other climate solutions, included legislation to make the 45Q incentive permanent, increase the credit values, extend the payout term, and expand the credit to a larger pool of projects. The National Petroleum Council has found that a carbon capture incentive at roughly this level could deploy carbon capture technology at scale and incentivize an additional 350 to 400 million tonnes per year of capacity, bringing the total U.S. capacity to ~500 million tonnes per year.⁴
- **The Energy Sector Innovation Credit (ESIC).** Beyond carbon capture, conservatives in the House and Senate are leading with broader bipartisan efforts on clean energy incentives which would update the energy portion of the tax code by allowing cutting-edge technologies to gain commercial viability and upend the status quo without distorting the free market.
- **Building on the strong bipartisan clean energy innovation record.** The last several Congresses have enacted record investments and authorizations to spur on clean energy innovation.

¹ <https://abcnews.go.com/Politics/wireStory/legislation-fight-sea-level-rise-florida-governor-76954829>

² <https://coastal.la.gov/our-plan/>

³ <https://www.ncdc.noaa.gov/billions/>

⁴ <https://dualchallenge.npc.org/>

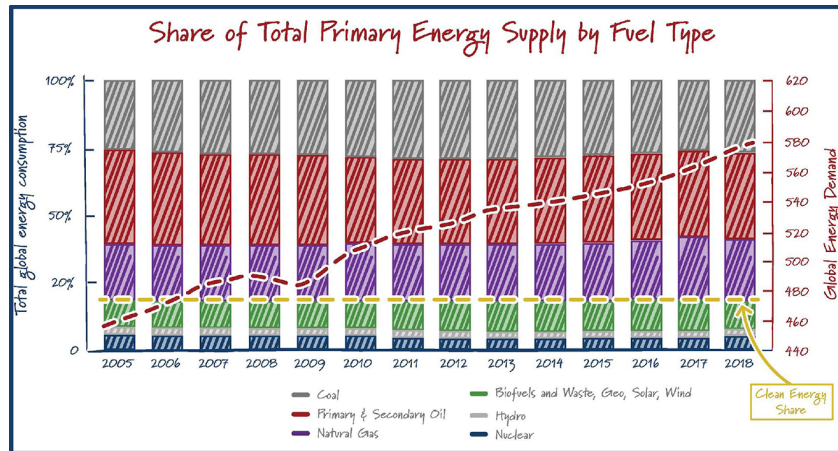
An American Innovation-Focused Approach To Solving the Global Climate Challenge

While the U.S. and a few other leaders have reversed our emissions trajectories, much of the rest of the world is growing their emissions as they grow their populations, industries, and quality of life.

The United States can truly lead on reducing global emissions. But, there is no tax or domestic regulation that will magically halt emissions around the world. We must focus on strengthening the American economy—not ceding ground to China or Russia.

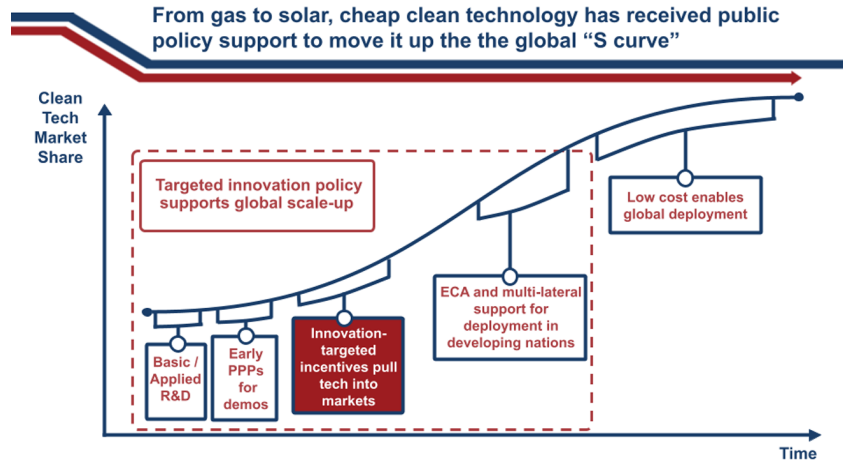
That's why it is important that U.S. energy policy synchronizes with the global nature of the climate challenge. Reducing American emissions is essential, and we have seen a significant decline already. Since U.S. emissions peaked in 2005, power sector emissions have fallen by roughly 40 percent as of 2020, largely due to the abundance of cleaner natural gas and resulting coal to gas power switching, as well as an increase in renewables. But, even if the U.S. somehow eliminated all of its carbon emissions tomorrow, just the growth in carbon emissions from today through 2050 by developing Asian countries (e.g., China, India, and other Eastern Asian nations) would exceed total U.S. emissions today. Going forward, we expect power sector emissions in the United States to flatline if natural gas prices remain low, and more action is required to ensure emissions continue to decrease here at home.

However, clean technology available today is simply not up to the task of global economy-wide decarbonization. As the chart below indicates, the global supply of clean energy has remained stagnant since 2005. We need to focus on breakthrough technologies that offer both better performance and lower costs than the traditional emitting technologies in the market today—only then should we expect to truly change this trajectory.



China's Belt and Road Initiative, their commitment to global infrastructure finance and development to tie together a huge swath of the developing world, is currently hugely outpacing all U.S. export credit and development finance activity. Among many other things, including clean energy technologies, China continues to finance new sub-critical coal plants—an outdated, extremely high emitting, but very cheap, coal technology—around the developing world.

There is hope for the United States to truly change the trajectory of global emissions and remain an energy leader. If Congress leads with an innovation-focused agenda, we can guide basic and applied R&D for clean energy innovation through to commercialization. America will lead in creating jobs in new industries, reestablishing America's global energy technology leadership, and driving down global emissions by creating clean energy options that are affordable to rapidly growing nations. To do all of this, we will first need to drive down the cost of clean energy. Smart, targeted tax incentives policy has a proven record on early deployment of technologies, bringing them down the learning curve on cost and up the S curve of global adoption.



A Carbon Capture Credit With Huge Returns

Carbon capture remains one of the most promising clean energy technologies, gaining recognition for its potential to improve the environmental footprint of heavy industrial processes and eventually draw back down atmospheric CO₂. The International Energy Agency has stated that carbon capture and storage is:

- Essential to achieving net-zero emissions as it tackles emissions from existing energy infrastructure,
- A solution for some of the most hard to decarbonize sectors, and
- An opportunity to directly remove carbon from the atmosphere.⁵

The federal carbon capture tax credit (affectionately known as “45Q”) has such broad support in Congress as well as energy stakeholders because it brings robust energy security, skilled labor and environmental benefits. The 45Q tax credit is viewed as the single most useful tool in spurring the development of carbon capture, utilization, and storage projects. Most recently, a two-year extension of 45Q was passed as part of the Energy Act of 2020. Developers now have until the end of 2025 to commence construction on projects to be eligible for the credit.

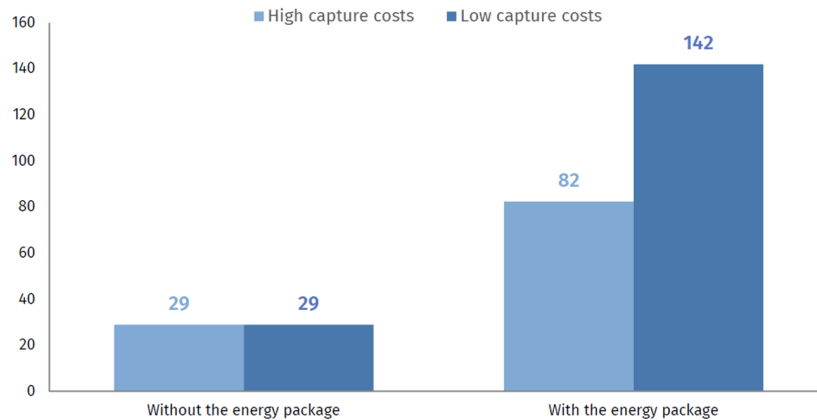
Carbon capture projects are often billion-dollar investments that require long-term certainty to pencil out and attract investment. Recent modeling from the Rhodium Group, a leading research firm, determined that this extension could enable an additional 53 to 113 million tons of capture capacity that would not have happened if not for this legislation.⁶ That is a significant impact as the U.S. captures only 25 million tonnes per year currently.

⁵ https://iea.blob.core.windows.net/assets/181b48b4-323f-454d-96fb-0bb1889d96a9/CCUS_in_clean_energy_transitions.pdf

⁶ <https://rhg.com/research/climate-progress-in-the-year-end-stimulus/>

Industrial carbon capture deployment through 2031

Cumulative million tons of capture capacity



Industrial carbon capture deployment through 2031⁷

Expanding and extending the 45Q credit is an idea that has been led by Republicans, and is now gaining bipartisan appeal due to the potential benefits. While the existing 45Q credit is expected to have a significant impact at reducing emissions from certain industrial facilities, additional value is needed to motivate carbon capture at scale. Currently, there are a variety of proposals, many of them bipartisan, that have been introduced to do just that. These proposals address a number of issues, that if implemented, could enable widespread deployment of carbon capture:

- A higher credit level would help make carbon capture relevant to a wider portfolio of emissions sources, help cover costs associated with transportation and storage infrastructure, and incentivize carbon capture at scale. According to the National Petroleum Council's 2019 report entitled Meeting the Dual Challenge: A Roadmap to At-Scale Deployment of Carbon Capture, Use, and Storage, extending and expanding current policies to achieve a combined level of ~\$90/tonne could incentivize an additional 75 to 85 million tonnes per year of capture capacity, bringing the total U.S. capacity to ~150 million tonnes per year. And to achieve carbon capture deployment at scale, policies that support financial incentives of ~\$110/tonne are needed and could enable an additional 350 to 400 million tonnes per year of capacity, bringing the total U.S. capacity to ~500 million tonnes per year.⁸
- Increasing the maximum credit payment period from 12 years to 20 years would better align the incentive with the expected lifetime of facilities and improve certainty for project developers.
- Reducing or eliminating the minimum capture eligibility thresholds would remove the arbitrary requirements limiting the pool of potential capture sources and enable smaller capture technologies to claim the credit.
- Implementing a direct pay elective would enable the pool of investors to increase since the ability to claim the credit would not be restricted to those who have a tax liability.
- Extending the date for projects to begin construction would provide project developers much-needed security that projects can meet the deadline to claim the credit, as well as enable even more projects to be developed within this time-frame.

A permanent extension (effectively a removal of the commence construction date, aligned with a bill introduced by Representatives Schweikert, Wenstrup, and Miller in April 2021 as part of Leader McCarthy's energy and climate package) generated gigatons of emissions reductions and new investments in both the power and industrial sectors.

⁷ Ibid

⁸ <https://dualchallenge.npc.org/>

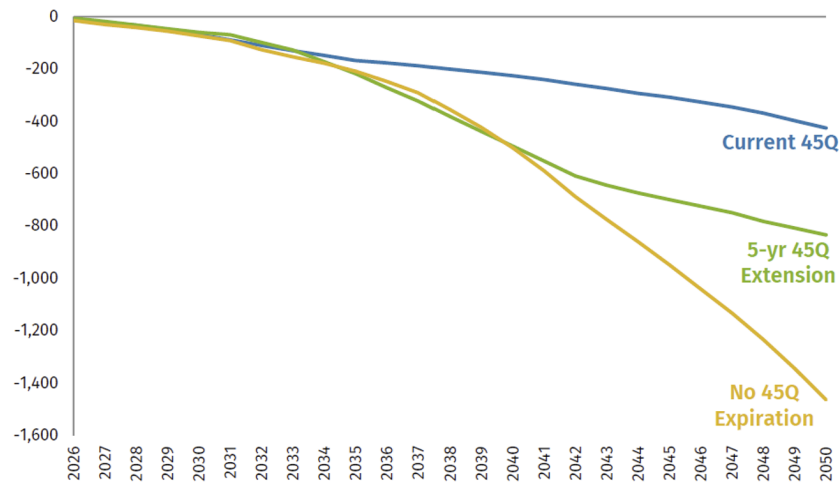
Here are five key points from their analysis:⁹

- Up to 157,000 job-years by 2035. Deployment could encourage new construction and operations jobs at existing manufacturing facilities and new power plants.
- Up to 52 GW of power sector carbon capture deployment by 2050. The 45Q credit could incentivize the build out of ultra-efficient fossil power plants with carbon capture, more than half the size of our current U.S. nuclear fleet. For a sense of scale, that'd be more than 170 zero-emission NET Power Allam cycle natural gas plants.
- Deployment in 30+ states.¹⁰ The 45Q credit could facilitate new carbon capture projects in a host of new states. For reference, a plant that captures 0.1 million metric tons is a large facility by the Global CCS Institute's standards and is eligible for claiming the credit.
- Up to 4 gigatons of emission reductions by 2050 collectively from the power and industrial sectors. That's equivalent to the emissions produced by 29 million cars for 30 years, or more than all the emissions produced from all U.S. coal and natural gas power plants produced over the last two years.
- \$42 per MWh. Advanced carbon capture is cost-competitive with many other clean energy sources in the power sector. Unlike variable renewable energy sources, it also does not require additional batteries or other investments to provide around-the-clock electricity.

FIGURE 4

Net cumulative avoided CO₂ emissions in low technology cost cases, 2025-2050

Million metric tons of CO₂ avoided



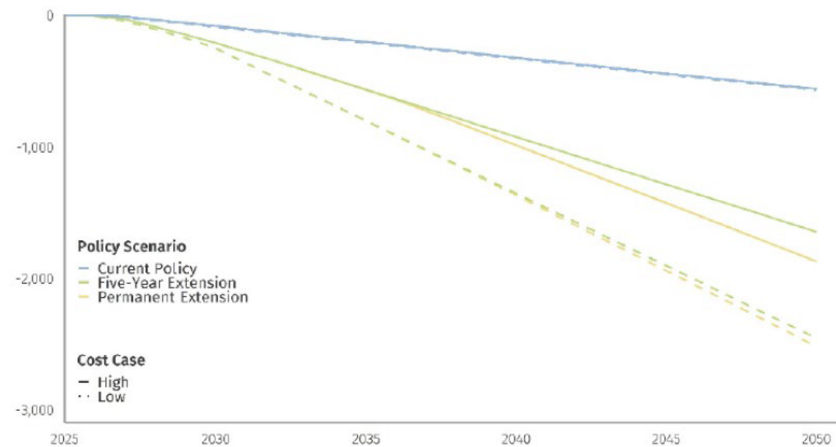
Source: Rhodium Group analysis

Note: Figure 4 only shows the power sector net cumulative avoided CO₂ emissions.

⁹ <https://rhg.com/research/opportunities-for-advancing-electric-power-sector-carbon-capture/>

¹⁰ <https://rhg.com/research/industrial-carbon-capture/>

FIGURE 6
Net cumulative avoided industrial CO₂ emissions with a 45Q credit, 2025-2050
 Million metric tons of CO₂ avoided



Source: Rhodium Group analysis

Note: Figure 6 only shows the industrial sector net cumulative avoided CO₂ emissions.

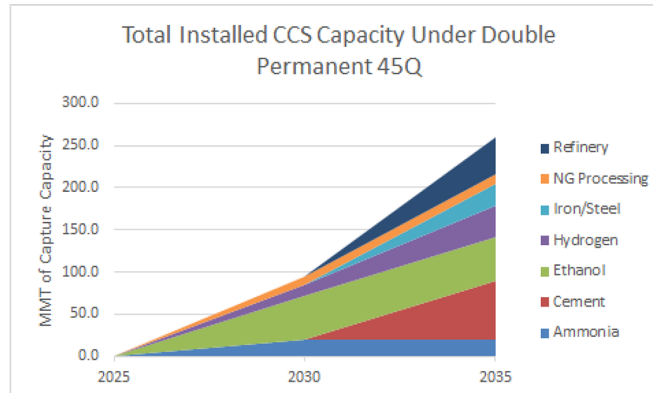
One reason 45Q is so effective: it can incentivize emissions reductions in both the power sector and the industrial sector, such as heavy industrial processes like cement and chemicals manufacturing, and the transportation fuel sectors—unlike renewable energy tax credits.

Expected deployment could catalyze emissions reductions totalling more than one-tenth of all U.S. industrial sector emissions.

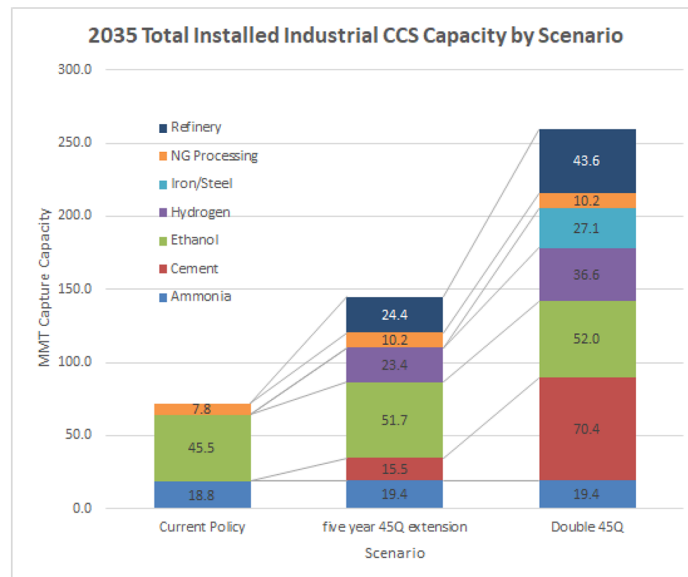
Support for carbon capture is diverse. Many states have recently implemented enabling carbon capture policies—from Wyoming to California. A recent National Petroleum Council carbon capture report—led by companies like Shell, Valero, and Southern Company—highlighted the 45Q extension as one of its top policy recommendations.¹¹

Carbon capture technology is on the cusp of a step change. And as you can see from the Rhodium analyses—building on 45Q can help make that goal a reality.

¹¹ <https://dualchallenge.npc.org/>



U.S. industrial carbon capture deployment through 2035 under a permanent, doubled 45Q by sector¹²



U.S. industrial carbon capture deployment through 2035 by sector under three different 45Q scenarios¹³

Energy Sector Innovation Credit (ESIC) Is a Game Changer

This week, Members of the U.S. House Ways and Means Committee, including Reps. Tom Reed (R-NY), Jimmy Panetta (D-CA), David Schweikert (R-AZ), Josh Gottheimer (D-NY), Darin LaHood (R-IL), and Tom Suozzi (D-NY) are expected to introduce the Energy Sector Innovation Credit (ESIC) Act, a bipartisan energy tax proposal to encourage innovation in the clean energy sector. A companion bill in the U.S. Senate is also expected to be introduced by Finance Committee Ranking Member Mike Crapo (R-ID) and Finance Committee member Sheldon Whitehouse (D-RI), among others.

The bipartisan Energy Sector Innovation Credit creates incentives for breakthrough innovation for power generation and storage technologies across the clean energy spectrum—a game-changing market signal for private sector innovators.

¹² Rhodium Group modeling commissioned by ClearPath

¹³ Ibid

ESIC is motivated by the need to rapidly scale and diversify American clean energy technologies through innovation as a means to achieve long-term emissions targets, create jobs, and provide safe and reliable energy. The credit is designed to help nascent technologies overcome the incumbency advantages of established technologies, including suboptimal resource location relative to existing grid infrastructure, lack of economies of scale, and the absence of existing constituencies.

The bill would establish a production incentive system for promising new power sector clean energy technologies needed to tackle climate change. For each breakthrough technology, the incentive automatically ramps down as individual technologies scale up in the commercial marketplace, not an arbitrary date like traditional energy credits. This credit could incentivize gigawatts of new clean energy generation needed to accelerate the U.S. power grid towards deep emissions reductions, including advanced nuclear, carbon capture, enhanced geothermal systems, offshore wind, long-duration storage and next-generation solar energy.

By making the credit proportional to how much a project earns from market sales, the credit eliminates the unintended ‘negative pricing’ distortions other credits have had on power markets.

The policy also would bolster the initial deployment of industrial carbon capture and direct air capture technologies, identified as an essential piece of the net-zero strategy of multiple U.S. utilities and corporate entities like Xcel Energy, U.S. Steel and Microsoft.

Strong Bipartisan Clean Energy Record

Finally, I cannot underscore this enough, partisan only climate policy is not sustainable. It results in short-term uncertainty and does not provide the market signals we need to move to a clean energy economy. We must work to have sustainable climate policy that includes the buy-in from both political parties in Congress.

In addition to the bipartisan authorizations in the Energy Act of 2020, the most recent FY20 & 21 appropriations bills are great successes to build on. They included critical programmatic direction and eagle-eyed investments in enhanced geothermal, advanced nuclear, carbon capture, grid-scale storage and other clean energy technologies included.

If you pair bipartisan efforts like the Energy Act of 2020 with incentive policy, like 45Q and ESIC, Congress will send an undeniable message that lawmakers are serious about keeping the U.S. in the top tier of countries pursuing clean and reliable energy breakthroughs.

Again, we must think globally when approaching this challenge. Partisan regulations will not pass the political sustainability test needed for climate solutions. Likewise, halting pipelines or placing moratoriums on oil and gas drilling on federal lands also has little to no impact on actual carbon dioxide emissions reductions in the U.S., let alone the rest of the world—particularly if we are simultaneously pushing OPEC+ for expanded oil and gas production globally. And none of that will make us more competitive with China. We agree, the cost of inaction on climate is high, and finding bipartisan common ground on clean energy innovation policy is priceless.

Thank you again for the opportunity to provide remarks. ClearPath is eager to assist the Select Committee in developing policies that help innovation reach the market place in the service of a stable global climate.

Ms. CASTOR. Terrific. Thanks so much.

Next up, Ms. Lipman, you are recognized for 5 minutes.

Welcome.

STATEMENT OF ZOE LIPMAN

Ms. LIPMAN. Thank you, Chair Castor, Ranking Member Graves, and members of the committee. I am Zoe Lipman, Director of Manufacturing and Advanced Transportation at the BlueGreen Alliance, which brings together labor unions and environmental organizations to build a clean, thriving, and equitable economy.

America is a good investment. Working people across the country are counting on Congress to see that. Investments to rebuild and retool American manufacturing, modernize our infrastructure systems, invest in our care economy, and create high-quality clean energy jobs are needed now and are needed at scale. They will be es-

sential to addressing the climate crisis and to ensuring a real and equitable recovery.

We cannot build back better if we fall behind the rest of the world in manufacturing the technology of the future here in the United States or if the workers and communities that need it most fail to see the benefits of innovation or a clean air economy.

That means investing not only in deploying climate solutions but making equally central investments in manufacturing, good jobs, and revitalizing communities.

Nowhere is this more true than in the coming shift to electric vehicles. EVs are coming. The actions and investments the policymakers make now will determine whether the U.S. economy, workers, and communities see the gains from the transformation of the transportation sector.

If done right, the shift to EVs will not only play a critical role in addressing climate change, but it can strengthen domestic manufacturing and supply chains, secure and grow good jobs, and help reverse decades' long declines in job quality and access to middle class careers for manufacturing workers and workers of color.

However, if policymakers fail to act, we risk being left behind in the next generation of automotive manufacturing and ceding future industries to global competitors. So what does this mean for Congress? We need to invest now to make the U.S. a leading market for EVs and do so with conditions that support working people.

In addition to globally competitive clean vehicle standards that give companies the certainty to invest here, we need deployment—we need incentives for deployment to ensure faster, broader, and fairer consumer and fleet adoption of domestically manufactured electric vehicles, from cars and trucks to school buses, and to expand EV charging infrastructure to all of those who will need it. And all of our public investments, regardless of how financed, must come with strong labor standards and incentivize domestic manufacturing throughout the supply chain.

For example, it is vital to update the section 30D Plug-In Electric Drive Vehicle Credit, the consumer EV credit, or a similar rebate to require vehicles and key components to be built here in order to receive the incentive and to support the retention and growth of good-paying jobs. The updated bill should also—updated credit should also facilitate purchase of EVs by those who would not otherwise be able to.

And it is absolutely critical that we invest to make the United States a leading manufacturer of EVs and the technology that goes into them. That means taking action to expand, retool, and convert U.S. automotive and component manufacturing through the Advanced Technology Vehicles Manufacturing Loan Program, manufacturing conversion grants, and the 48C Manufacturing Investment Tax Credit, which applies to a wide range of manufacturing clean energy technologies, as well as to the automotive sector.

We need to onshore critical supply chains, such as batteries, cells, and the materials that go into them, including through a new manufacturing investment tax credit and production tax credit.

We need to modernize and cut emissions from our energy-intensive industrial base, as I have heard other speakers mention, and

target investment to revitalize manufacturing communities and build new pathways into family-supporting careers.

Auto and components manufacturing employs around a million workers directly and millions more indirectly, from mining and steelmaking, to engines and batteries, to final assembly, to auto dealerships, and a multitude of local jobs supported in manufacturing communities.

We are already fighting against decades of shortsighted policy and investment decisions that have spurred offshoring and outsourcing, and cost manufacturing jobs. Those choices have driven down the living and working standards of manufacturing workers, often hitting Black workers first and hardest, and cost access to family-supporting careers in too many communities.

At the same time, the United States is already lagging far behind our competitors in investments to capture EV manufacturing and jobs and to ensure that good advanced engine and transmission, powertrain jobs of today become the good EV propulsion jobs of tomorrow.

But we can and must reverse these trends and take a better path. Whether or not working people across America see the gains from the coming clean economy depends on what Congress does now.

Thanks so much.

[The statement of Ms. Lipman follows:]

**Testimony of Zoe Lipman
Director of Advanced Manufacturing and Transportation
BlueGreen Alliance**

**U.S. House of Representatives
Select Committee on the Climate Crisis
*Financing Climate Solutions and Job Creation***

July 29, 2021

Thank you Chairwoman Castor, Ranking Member Graves, and members of the committee.

I am Zoe Lipman, Director of Manufacturing and Advanced Transportation at the BlueGreen Alliance. The BlueGreen Alliance brings together labor unions and environmental organizations to solve today's environmental challenges in ways that create and maintain quality jobs and build a clean, thriving, and equitable economy.

America is a good investment. Working people across the country are counting on Congress to see that. We need to rebuild and retool American manufacturing, repair and modernize our infrastructure systems, invest in our care economy, and create high-quality clean energy jobs. Making these investments at scale, and doing them right, will be essential to addressing the climate crisis, and ensuring a real and equitable recovery.

But we cannot build back better if we fall behind the rest of the world in manufacturing the technology of the future here in the United States, or if the workers and communities that need it most fail to see the benefits from innovation or a cleaner economy. That means investing not only in deploying climate solutions, but in the equally central investments we need to ensure workers, working families, and communities see the benefit of this transition.

Nowhere is this more true than in the global shift to electric vehicles (EVs).

EVs are coming. The actions and investments made by policymakers now will determine whether the U.S. economy, workers, and communities see the gains from the transformation of the transportation sector.

It is critical that we take action now to position the United States as a leading market for the most advanced vehicles, while at the same time making serious investments to strengthen advanced vehicle manufacturing, to bring electric vehicle

technology and components manufacturing here and into today's factories and to build good jobs in industries that are clean and safe for workers and communities alike.

If done right, the shift to EVs will not only play a critical role in addressing climate change, but it can strengthen domestic manufacturing and supply chains, secure and grow good jobs, and help reverse decades-long declines in jobs quality and access to middle-class careers for manufacturing workers and workers of color.

By contrast, however, if policymakers fail to act, the United States risks being left behind in the global shift to using and manufacturing the next generation of automotive technology, which will cost good manufacturing jobs in communities across the nation, cede future industries to our competitors, leave many rural and urban communities behind, and aggravate inequality.

Auto and components manufacturing makes up the single largest sector of U.S. manufacturing, employing around 1 million workers directly, and millions more indirectly—from mining and steelmaking to engines and batteries to final assembly, to auto dealerships and the multitude of local jobs supported in manufacturing communities.

Over the past decade, auto sector companies and workers have demonstrated that they can build good union jobs making advanced clean and efficient vehicle technology. But now, our global economic competitors, including in Europe and Asia, are rushing to capture the jobs and economic benefits from the global transition to electric vehicles. The United States is lagging far behind in investments to capture these gains, and to ensure that good advanced engine and transmission jobs—what we know as the “powertrain”—jobs of today become the good EV propulsion jobs of tomorrow.

At the same time, decades of shortsighted policy and investment decisions have spurred offshoring and outsourcing, cost manufacturing jobs, driven down the living and working standards of manufacturing workers, and cost access to family-supporting careers in too many communities.

Now is the time to act to reverse these trends and eliminate these risks. Critical decisions and investments that will shape the industry, domestic jobs, and the impacts on climate and our economy for decades will be made over the next few years.

An effective and equitable transition means we must lead in advanced clean vehicle deployment *and* manufacturing. This means sufficient investment in the cleanest and most advanced vehicle technology, *and* in ensuring we build the next generation of vehicle technology in America and build good jobs throughout the transportation supply chain.

We need to invest to make the U.S. a leading market for EVs—and do so with conditions that support working people.

In conjunction with globally competitive fuel economy and vehicle greenhouse gas (GHG) standards that give companies the certainty to invest and invest here, we need to adopt incentives to ensure faster, broader, and fairer consumer and fleet adoption of domestically manufactured electric vehicles—whether that's cars, trucks, buses, school buses or the U.S. Postal Service—and to extend EV charging infrastructure to all those who will need it.

At the same time, all our public investments—through traditional or novel infrastructure finance or through the tax code—must come with strong labor standards and incentivize domestic manufacturing throughout the supply chain.

For example, the Section 30D (now 36C) Plug-In Electric Drive Vehicle Credit for consumers or a similar rebate plays an important role in building a domestic EV market, and it is critical to update it to require that vehicles and key components to be built here to receive the incentive, to support the retention and growth of good paying U.S. manufacturing jobs, and to spur automakers to further invest in building their most advanced vehicles here. The updated bill should also facilitate purchase of EVs by those who would not otherwise be able to purchase an EV.

We need to invest to make the United States a leading manufacturer of EVs and the technology that goes into them.

Catching up in the deployment race alone does not guarantee that working people and communities see the gains from the shift to EVs. We also need to make a globally competitive manufacturing investment through a robust set of manufacturing tax credits, grants, and loans, to:

- Expand, retool and convert U.S. automotive and component manufacturing to build the technology of the future;
- Onshore critical supply chains, such as batteries, cells and the materials that go into them; and
- Rebuild manufacturing communities and jobs.

Notably, this includes:

- Restoring, updating and expanding the scope—and increasing the loan authority—of the Advanced Technology Vehicles Manufacturing (ATVM) loan program;
- Robustly funding a domestic manufacturing conversion grant program to retool existing facilities—especially those at risk of closure—to build EV and related advanced technology;
- Creating new manufacturing investment and production tax credits specifically focused on filling critical gaps in the EV supply chain (as well as in other clean technologies such as solar and offshore wind) and bringing new production to scale (again in conjunction with related grants or loans);
- Funding the 48C Advanced Energy Manufacturing Tax Credit (including direct pay) and/or a complementary grant program to establish, expand or retool manufacturing to build a wide range of clean and efficient technology including for advanced and electric vehicles, and to focus that investment on targeted communities. This program should be expanded to fund investments to reduce emissions at industrial facilities as well; and
- Making manufacturing and community investments that work together to build a new generation of clean manufacturing, revitalize communities, and create good jobs.

In addition, reaching beyond the automotive sector, though critical to it, we need to reinvest in our energy-intensive industrial base, to modernize and cut emissions from production of key materials such as steel and aluminum that are as critical to the future economy as they are to the economy today. We have the opportunity to make these facilities the cleanest and most competitive in the world, while safeguarding jobs and helping to cut emissions and drive up labor standards worldwide.

Manufacturing as a whole matters, and reinvesting in manufacturing will be critical to meeting our climate, economic, and equity goals.

As is vividly demonstrated in the transportation sector, investing in transforming manufacturing will play a fundamental role in ensuring we move quickly to produce and adopt the clean technologies of the future. The energy-intensive industrial sector also represents a major, and one of the fastest growing, sources of U.S. emissions, and investing to modernize and decarbonize this sector will be critical to meeting our climate goals while securing jobs and building momentum for ongoing sustainable economic change. In the United States, the manufacturing sector contributes \$2 trillion a year to GDP, and with its purchases of goods and services, comprises approximately one-third of our total economic output, nearly two-thirds of private sector R&D, and one in 11 jobs.ⁱ Manufacturing has a proven ability to provide high-wage, high-skill jobs, and a reliable pathway into the middle class for millions of Americans. It has not always lived up to that promise, however, and these pathways are unavailable to too many workers today.

As decades of damaging trade, tax, and labor policy have weakened U.S. manufacturing relative to our global competitors and hollowed out manufacturing communities, this critical pathway to the middle class has narrowed. For example: from 2000 to 2016, the U.S. lost over 5 million manufacturing jobs (1.5 million in the Midwest alone), exacerbating inequality, as high-skill jobs—many of which do not require a college degree—dissolved in the midst of the financial crisis and only partially recovered in the aftermath.ⁱⁱ

For communities of color—especially Black workers—the impact of poor policy has been even more grave. Ongoing declines in U.S. manufacturing—particularly in sectors such as auto manufacturing where Black workers are comparatively strongly represented—have hit Black workers first and hardest.

Most recently, the COVID-19 pandemic demonstrated the power of advanced manufacturing to meet critical needs, including PPE and other medical equipment. But it also underscored dangerous gaps in critical supply chains, and the grave shortfalls in working conditions and safety for too many workers.

But there is nothing inevitable about this outcome. Instead policymakers have a clear opportunity now to learn from the past and take a new approach to rebuilding a U.S. manufacturing sector that once again plays a defining role in a strong, equitable, and resilient economy.

Finally, just as manufacturing as a whole matters, so too does a broader transportation agenda.

Our urgent transportation needs include not only EV deployment and infrastructure commitments, but also major investments in transformed transportation systems, such as sorely-needed funding for public transit, support for clean, efficient, and equitable freight and commercial transportation, and much more.

We are at a crossroads. The global economy is changing; and the climate, economic and justice challenges we face are urgent and intertwined. Now is the time to invest at the scale necessary to lead in the clean transportation and technology of the future, lift up workers and communities across the country, and restore U.S. manufacturing and good jobs in a more prosperous, equitable—and clean—economy.

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Ms. CASTOR. Well, thank you all so much. All of your testimony was insightful and very constructive, and we appreciate it.

So now we will move on to questions. I will recognize myself first for 5 minutes for questions.

Ms. Andrade, thank you so much for all of your work in the State of Florida and the Southeast. It is great news that you are targeting expansion. There—I mean, neighbors back home they are hungry to lower their electric bills and to weatherize their homes, and it is a bear to try to find the capital, the little bit of a loan to help them get there, but we know it has such incredible benefits of lowering their costs and lowering pollution for everyone.

So we are headed into a big bipartisan agreement here where we are going to be able to target a number of different initiatives to lower costs and ramp up renewables. You recommended to us kind of a green bank model that has worked well in other regions of the country.

How can this—go through how an accelerator should be structured and how do we ensure that we are really getting help to folks who truly need it, working class communities, communities of color that have long carried a disproportionate burden of pollution and often have trouble getting those loan dollars?

Ms. ANDRADE. Yes. Thank you very much, Representative Castor. That is a very good question, and I am happy to try and address it as best I can.

Green banks, there are 23 green banks across the nation right now. They take different forms and shapes, depending on each state and the needs. One of the advantages of green banks is that they can adapt to the needs of each state and community. We are very flexible, nimble, and because typically they are independent nonprofits—we happen to be the only CDFI, but other structures are quasi state funded, they have a combination of capital, they really can address the specific issues in each state.

So currently there are efforts across the nation to start up more new green banks because what green banks do is really facilitate and channel funding from the private, public, and philanthropic sector into communities for these different purposes, whether it is EVs, whether it is resilience and solar, or a combination of all of those.

We are proposing, and what we find, is that there is a huge demand, of course, as we are all talking about here, but especially the low- and moderate-income communities with the working class

Americans are being left behind and can't access the benefits of the clean energy economy. It has always been kind of the—you know, something that the wealthy can access. The tax credits are typically something that low-income communities can't access, even the solar tax credits.

So we find that funding a clean energy accelerator would allow green banks across the nation to proliferate, to also capitalize our existing funds so that we can create more programs, and in that creation there is a provision to earmark 40 percent of the funding for LMI communities to ensure equitable deployment of capital.

And one of the last comments would be that importantly green banks, because they are independent and nonprofit, which is the way that we are recommending that the clean energy accelerator be structured, as an independent non-profit, that allows us to crowd in more capital, to leverage the balance sheet and not be tied to Federal funds that are not flexible.

Green banks across the nation are leveraging these public funding 8 to 1. SELF started with a Department of Energy grant from the previous American Reinvestment and Recovery Act, and here we are 10 years later, and we have leveraged public private funding eight times, and we continue to expand.

So that is our recommendation is invest in these green banks that can multiply the effects that capital and the job creation throughout.

Ms. CASTOR. Thank you very much.

And just back home in the Tampa Bay area, I keep meeting all of these new small business owners and startups that are getting into this business, and I know that, again, there is a hunger out there among neighbors across all communities to lower their electric bills, and I love the win-win-win proposition of it all.

So, Ms. Lipman, I loved checking out the new Ford F-150 Lightning the other day. It is—I know they have already over a hundred thousand on order, and these are good American-made vehicles. We have got to win the global competition. I have all the faith in the world in our auto workers and all along the supply chain, so we are working on the blend of tax credits.

Highlight for us quickly again the priorities here to make sure that consumers can access these vehicles and we can build them ASAP.

Ms. LIPMAN. Thanks very much for that question.

I think we are really excited by products like you mentioned as well. It is exactly what we want to see the future look like in the automotive sector. And I think we are rightly recognizing that worldwide our competitors in Europe and Asia are rushing ahead to take advantage of this coming industry globally.

And if we are going to ensure we capture this opportunity, we need both to spur—make U.S. a leading market and to spur deployment and to ensure that we do that in both the electric vehicle, you know, for cars, for trucks, and through fleets, as well as in charging and to ensure that for across those incentives we are supporting both high labor standards so we are ensuring—we are building as good or better jobs in the clean technologies of the future as we are in the jobs today and—

Ms. CASTOR. Unfortunately, Zoe, Ms. Lipman, my time is short.

Ms. LIPMAN. Oh, sorry.

Ms. CASTOR. We have other members, and we are going to talk more and get—

Ms. LIPMAN. Manufacturing incentives.

Ms. CASTOR [continuing]. Other questions from members, so I am going to go now and recognize Mrs. Miller. You are recognized for 5 minutes. Thank you.

Mrs. MILLER. Thank you, Chair Castor and Ranking Member Graves, and thank you all for being here today.

I do want to say that I strongly support 45Q and carbon capture and all of the progress we have made scientifically moving forward. If we on this committee are really serious about addressing climate change and ensuring that the Americans and the rest of us all around the globe can access affordable and reliable energy, we must embrace carbon capture.

Some of my colleagues across the aisle need to broaden their view on how carbon capture can impact everybody around the world. Utilization of carbon capture will allow us to continue to use cheap baseload energy, which would also include coal. Specifically exporting this technology abroad will help the developing nations power up as they are behind us in so many ways, while we will also be reducing global emissions. It is a win-win situation.

That is why keeping incentives in place to help fine-tune the technology is key. Making carbon capture accessible and affordable is really a critical first step.

Mr. Powell, what steps are needed to make carbon capture available worldwide?

Mr. POWELL. Well, thank you so much, Congresswoman Miller, and thank you for your leadership on this very important issue.

The recent legislation that you introduced as part of Leader McCarthy's energy innovation package I think is a terrific first step to make this more accessible. So amongst other things, just to summarize, your legislation effectively made the credit [inaudible] in the tax code. It effectively doubled the value of the credit from its current state up to something more—it is \$85 a ton and then paying out for more years which would effectively double its value.

And, very importantly, it radically increased the number of facilities, including even very small facilities, that would be able to take advantage of and capture that credit. So, collectively, that hugely expands the number of facilities that could take on something like this.

What we have learned in the experience of both radically reducing the cost of natural gas-fired power, and in wind and solar, is that deployment is key to bring down costs. We learn by doing the more of these things we install. So if we can use a significantly enhanced credit like that to hugely increase the uptake of this across more and more facilities and start building out the infrastructure across the country that could move that captured CO₂ either to permanent sequestration sites or to places where it can be utilized for other means as a commodity, that would be a terrific first step.

And then we need to think about strengthening our export authorities in this space so that we can get that technology out to more of the rapidly developing world, and there are a number of things we can do there as well.

Mrs. MILLER. That is part of it because of the worldwide need. How would this utilization of technologies like the carbon capture reduce energy poverty?

Mr. POWELL. Absolutely. So across the world, there are enormous remaining fossil fuel assets. In many places they are an extremely affordable way to both generate electricity and to power heavy industry or to heat cities. If there is some way that we can continue using these resources in a low emissions future, that is a terrific tool to keep available for the rapidly developing world.

If you look at countries like China and Indonesia, they are continuing to build coal-fired power plants and coal-fired power technology because they have tremendous coal reserves. Many other countries have tremendous gas reserves.

Frankly, if we don't find some way to allow those countries to retrofit a lot of what they have built with carbon capture technology, I don't see any path to solving the global emissions challenge and actually reducing the risks of climate change.

There is just so much steel in the ground now that is using these assets, literally a terawatt of coal in China, the size of the entire U.S. power grid alone, and still rapidly developing in a number of other countries.

Mrs. MILLER. Don't you think the utilization of this technology would also create jobs in the developing nations as well?

Mr. POWELL. Absolutely. I mean, if you look at China alone, there are—you know, for better or for worse, there are 10 million people employed in the coal value chain in China alone and hundreds of thousands and millions in many other rapidly developing countries. And to preserve those jobs in many of those places or even to expand the jobs in this industry, but to do so in a more responsible way going forward to capture the emissions, that is a win-win for development and for global clean energy.

Mrs. MILLER. Because they are going to keep doing it.

Thank you so much. I yield back my time.

Ms. CASTOR. Okay. Next up, Rep. Bonamici, you are recognized for 5 minutes.

Ms. BONAMICI. Thank you so much, Chair Castor and Ranking Member Graves, and thank you to our witnesses.

So this is a hearing about financing climate solutions and job creation, and I serve on the Education and Labor Committee, and I do a lot of work in the workforce area, so I am going to focus on the job creation part of this hearing.

And to follow up on Representative Miller's questioning, my grandfather was a coal miner. I am the granddaughter of a coal miner, and I know that what is important to transition to a clean energy economy while making workers a priority. We have the opportunity to create millions of good-paying, high-quality union jobs as we make this transition. But it can't be a race to the bottom in terms of wages, and that is what I am concerned that there is this fear across the country that people won't get good jobs, they will get low-paying jobs, and that is a concern.

We need to make worker protections and workforce development a priority, and our Climate Action Plan integrates Buy American requirements, Davis-Bacon prevailing wage requirements, and the use of Community Benefit Agreements and Project Labor Agree-

ments into Federal clean energy and resilience investments, and that is important.

Our transition to a clean energy economy also offers an opportunity to connect people who are unemployed or underemployed with the training they need to access those jobs. And earlier this year, I reintroduced my bipartisan, bicameral BUILDS Act, and that bill supports people who have historically faced barriers to employment, particularly women and people of color. It gives them access to register for apprenticeships and the support services they need to secure those good-paying, high-quality jobs in transportation, clean energy, construction, and infrastructure.

So, Ms. Lipman, the BlueGreen Alliance's manufacturing agenda does highlight the importance of high-quality jobs with labor standards and creating pathways for more people to access those jobs. So how can tools like keeping the Benefit Agreements and investments, and registered apprenticeships help improve those economic opportunities particularly for frontline communities and increase access to good-paying manufacturing jobs?

Ms. LIPMAN. Thanks so much.

You have already laid out some of the key priorities here. We need to ensure, as I started to mention previously, that as we deploy, as we have incentives of any kind, public funding of any kind that deploys this technology, that it comes with high labor standards, with incentives to utilize the kinds of community benefit and Community Workforce Agreements that you mentioned, that we invest in sufficient scale to ensure that we can reach—can rebuild the manufacturing communities, both to the communities and the workers who need it most, and that we target this investment to a whole range of communities who have seen this investment.

And where we can ensure that we are bringing back good-paying industrial jobs to industrial communities that have lost them and energy communities that have lost them, as you mentioned, as well as to ensure that we are providing investment in communities that have historically been excluded from that investment and that, as someone else mentioned earlier, that the benefits from this clean energy transition reach every community, that we see EV charging in rural and low-income communities, not just where the market price is provided.

Ms. BONAMICI. Absolutely. And also, Ms. Lipman, what Federal investments would help scale up our nation's manufacturing supply chain to meet the current needs of transitioning to a clean energy economy?

And how can Congress support efforts to retool existing factories or facilities or incentivize new businesses to manufacture EVs and clean energy technologies? What would we need to do?

Ms. LIPMAN. Absolutely. We have a host of tools at our disposal that we have the opportunity to more robustly fund and use more aggressively. Those include the Advanced Technology Vehicles Manufacturing Loan Program that could be expanded and used more broadly.

We need to fund a Manufacturing Conversion Grants Program that would help ensure that we retool facilities that may be at risk of closure to build the technology for the future, and we need to, in addition to, as we mentioned the domestic manufacturing condi-

tions on the deployment incentives, look at a new manufacturing investment and production tax credits to fill the supply chain gaps that we have seen so vividly missing here and that are so important to bring battery and cell and other production here, not to mention things like semiconductors.

Ms. BONAMICI. Right.

Ms. LIPMAN. So, for all of these things, it will be critical, not to mention targeting these investments.

Ms. BONAMICI. Tremendous amount of potential.

Madam Chair, as I yield back, I just want to take a moment to thank Maxine Sugarman of my staff, who has been with me for 6 years, and has staffed me on not only the Select Committee on Climate Crisis but also on many of the labor and education issues, and science committee issues. Maxine is heading off to law school soon, but I just want to thank her for her exemplary work over the years, particularly on this committee.

Ms. CASTOR. Well, thank you, Rep. Bonamici. And Maxine has been a wonderful staff member part of the Climate Crisis family here, and she hasn't just helped you out, but she has helped out the entire committee.

So good luck in law school, Maxine. I think you are just getting started out there in the world.

Ms. BONAMICI. Thank you, Madam Chair. I yield back.

Ms. CASTOR. Thank you.

Next we will go to Congressman Gonzalez. Good morning. You are recognized for 5 minutes.

Mr. GONZALEZ. Good morning, and thank you for holding this hearing.

I have to start, unfortunately, I deeply respect the Chair and everybody on this committee and everyone across Congress. I have to respectfully disagree with the idea that we are having a remote hearing today. From what I can tell, there is no guidance whatsoever that suggests that we cannot meet in person safely. I think over 85 percent of Members are vaccinated. I don't know what percent of this committee. I have been vaccinated from day one. I urged all of my constituents to do it. I know there is still hesitancy out there.

But there is nothing anywhere that suggests that we can't figure out a way to meet safely in person, and I think it is important that we show the country that we can go back to normal and stay normal and meet in person.

Also, I think it is worth noting this is a global virus, much like climate change. This is a global virus, and there will be variants for the rest of our lives. There is effectively zero chance that we are going to eradicate COVID from Planet Earth, and if we run and hide every time there is a variant, we will never, ever get back to normal.

I don't know, I am a parent of young kids. My wife and I, we are not wild about locking ourselves up for another year if that is the way that this is going to happen, and I know that my constituents feel the exact same way.

Ms. CASTOR. Well, I want to thank you, Rep. Gonzalez, because I—this was my call, and I thought, well, since all of our witnesses were remote and it was a 9:00 a.m. early morning hearing that just

for convenience sake, we would do it. If we were in the committee room, we would be masked, and this is a little more comfortable way to do it. But I prefer the in-person hearings, and we will be doing those on a more regular basis.

But, please, everybody, if you are not vaccinated, get vaccinated so that we can crush COVID.

Mr. GONZALEZ. Yes, ma'am.

Ms. CASTOR. And I won't ding you on your time here. You will get some extra time. So please go ahead.

Mr. GONZALEZ. Well, yes, ma'am, and that is good to hear, so I appreciate that explanation.

So, as I said, it is good to see everyone, and I thank the witnesses for joining us. As I have said, no doubt climate change is a challenge that warrants our attention, but like any issue, we do need a policy approach that is realistic and cost effective.

It requires we balance a broad array of interests and commitments, such as energy security, economic growth, competitiveness with Russia and China, and human rights.

The good news is there is quite a bit of common ground on these policies, particularly on innovation, a competitive advantage that the U.S. can tap that exists nowhere else in the world. In my view, policy proposals should be focused on stimulating an innovation ecosystem here in the U.S. that have the potential to drive real technological breakthroughs that are affordable and reduce our carbon footprint.

To that end, I recently introduced the Steel Upgrading Partnerships and Emissions Reduction Act, which passed out of the Science Committee, or the SUPER Act, legislation that would establish a program at DOE to further the research, development, demonstration, and commercial application of breakthrough technologies for low-emissions steel manufacturing.

By developing and commercializing these technologies, we can ensure U.S. industry remains competitive in global markets while reducing emissions in the steelmaking process, again balancing economic growth with emissions reduction.

I have also introduced the Coordinated Action to Capture Harmful Emissions Act, a bill that would expand the values of 45Q tax credit for carbon capture technology and eliminate the arbitrary thresholds on facilities that limit deployment.

Mr. Powell, I appreciated your testimony because you are absolutely right that carbon capture has to be the central focus of our effort to decarbonize the power and industrial sectors. I don't know how we can do it without carbon capture. Innovation, public-private partnerships, and incentive-based actions have proven to work, and each of these bills relies on these proven abilities, and I encourage my colleagues to consider each bill as we debate policy solutions.

So, Mr. Powell, I want to start my questions with you. And, first off, it is good to see you. Reasonable estimates of the Green New Deal suggest the electricity portion alone costs around \$500 billion per year, or about \$4,000 annually per American household. I want to highlight this because I, again, think it is important we recognize that massive reductions in greenhouse gas emissions do have a cost associated with them, and it is going to force us to deal with various trade-offs. There is a great deal of interest, investment, and

talent going into various technologies, but which are you most excited about? And how can Congress accelerate their development?

Mr. POWELL. Well, first, again, thank you, Representative Gonzalez, for your terrific leadership on this. I think that between the terrifically named SUPER Act and CATCH Act, I think that starts to set up really a comprehensive regime to think about radically reducing the cost of steel and other commodities in the industrial sector.

Just to reiterate, industrial emissions actually in the United States last year for the first time were about equal to power sector emissions, and most estimates have them going to being the predominant source of emissions for the United States by 2030. So finding ways through innovation and incentives to start bringing those down, alongside all the success we have had in power and increasingly in transportation I think is very important.

Unfortunately, there is no silver bullet technology. We need a portfolio of approaches to do this. Carbon capture is extremely important, and for many parts of the industrial sector, that is the most available technology today, literally just kind of putting a cap on top of a facility and capturing those emissions. Over time we should also be looking, particularly in the industrial sector, at ways to do things differently within those facilities. A huge source of those emissions are heat in the industrial sector. Today, in many blast furnace steel plants, for example, a lot of that heat comes from either natural gas or coke and coal, part of the process.

If we could find some alternative way to produce that heat in a fully clean way, either with clean hydrogen or high-temperature nuclear reactors or heat-generating units with carbon capture on them themselves, that will be a huge step forward.

And then, lastly, we can think about entirely new ways to run those processes. There are now electric chemical approaches well under development and heavily underfinanced in the venture capital sector, but entirely new ways to reduce the iron—or reducing the oxygen out of iron oxide, the first part of the steelmaking process. We should be deeply investing in basic and applied research and demonstrations of those advanced technologies as well.

Mr. GONZALEZ. Thank you.

I see my time is almost up, but I think it is helpful to think about it that way is, you know, how far along on the R&D curve are we when it comes to decarbonizing the industrial sector. I think from an R&D standpoint, we have developed a lot of technologies in the power sector, we need to make them more efficient, bring the costs down, et cetera, but looking at the industrial sector, where are we and how can we make improvements going forward I think should be a central focus for this committee and much of Congress.

With that, I yield back.

Ms. CASTOR. Thank you.

Next we will go to Congresswoman Brownley. You are recognized for 5 minutes.

Ms. BROWNLEY. Thank you, Madam Chair. Thank you for having this hearing.

My first question is to Ms. Andrade. Hopefully I am pronouncing your name somewhat correctly. You know, today, we are talking a lot about green banks, which you did, and clean energy tax credits,

and I just wanted to ask you if you could talk a little bit how these two things can really sort of compliment each other. And so if you could speak to that.

Ms. ANDRADE. Thank you.

Yes. So I think Mr. Powell said something that I just want to start with, which is there is no silver bullet to address these issues, and we have to work in multilayer and multilane programs to address these issues.

Green banks can bring capital into communities to solve a series of issues, specifically to finance everything from R&D that has been talked about here to EV financing for low- and moderate-income or not. And the financing the green banks can deploy is flexible and can leverage additional capital.

So, for example, one of the things that we have been hearing more and more is that developers that are building affordable housing don't really go that extra mile to build the climate resilient, maximum energy efficient and even solar or, you know, wind powered buildings because of the cost.

So that is where tax credits come in, for example, where if there were tax credits that incentivize and motivated resilience investment, solar investment—there is a Federal tax credit for solar, but the capture of that tax credit remains at a very high level for the developers. It doesn't go down to the tenants, for example. Typically it is used to fill those capital stacks and to make the financing work.

So what we are finding is that there is a need for more flexible, low-cost capital to complete these capital stacks so we can invest in better buildings that are resilient, that are efficient, that are not only affordable to get into and to rent or to own but actually to operate over time.

So that is the gap that a combination of low-cost flexible capital deployed through green banks and a policy of tax credits that motivates energy efficiency and climate resilience can bring together, can really unleash and catalyze a whole new standard of building in a way that works for everybody. For developers that want to make profits, for people that live in those homes, and for communities that are trying to stabilize and revitalize.

Ms. BROWNLEY. Thank you very much.

Mr. Larsen, I am working on a bill on sustainable aviation fuel and, you know, I think we are moving forward certainly with a production incentive tax. And my question is, you know, this is sort of a new emerging area. We haven't had a tax incentive federally for aviation in this particular area.

So I am wondering, you know—I believe, and I want to just hear what your opinion is, is that to really get this industry going, we need both. We need both the investment and the Production Tax Credit. Can you give your opinion on that?

Mr. LARSEN. Yes. No, thank you for the question.

I think the most important thing to keep in mind in policy design for all of this is something Rich Powell said, which is the way that we get all of these technologies to get down in cost is through deployment. Right? And so—and that goes for everything, from an electric vehicle, to the next generation of wind farms, to sustainable aviation fuel. And I think there is lots of different combina-

tions of incentives and tax credits that can meet that general goal of accelerating deployment and getting costs down.

I don't think any investor is going to go big on major production of clean fuels without knowing that there is going to be a market for it, and one way to do that is through a production incentive. At the same time, these are very large facilities that have a lot of capital involved, and so finding ways to get over that first hurdle of just building the facility is going to be important.

I think a combination of PTC and ITC is one way to do that. I think, you know, it could also be through deployment grants out of DOE or something like that. Right? There is lots of different—back to the no silver bullet point. Right?

But I would say, you know, thinking through how different levers can fit together here to make—get those new technologies to scale is going to be very important.

Ms. BROWNLEY. Thank you so much.

And thank you, Madam Chair. I yield back.

Ms. CASTOR. Great.

Next was Mr. Armstrong. Is he there? If not, let's see, Mr. Crenshaw, are you ready?

So next we will to—we will recognize Mr. Crenshaw for 5 minutes.

Mr. CRENSHAW. All right. I can be ready. We will do this.

And thank you all for being here. I appreciate it.

I do have to start out with echoing some of my colleagues' statements. We should be in person. This hearing is about science. Our decisions here in the Capitol should be about science, and I could go into a long tirade about where the CDC got their guidance and where our own House doctor got their guidance. We have all been vaccinated. It is safe. We need to show some leadership.

I would also say I don't know how we are supposed to keep engaging in bipartisanship when the majority is threatening the minority with fines and jail time for not wearing a mask. This has gone too far. It has gone way too far. You are demeaning us, making us walk through metal detectors to get onto the House floor, if that makes any security sense whatsoever. We have to stop this so that we can get to the real work, which is policy. Okay?

So now I will transition to policy. And I want to start with asking a question. When we are talking about tax incentives and ways to decrease global emissions, that is a common goal. I can't emphasize that enough. But is it about reducing carbon emissions or is it about promoting wind and solar? And are wind and solar just getting preferential treatment? And they are, of course.

You know, for instance, why is there a pushback on moving from a PTC and ITC to a tech neutral tax credit? That seems like a common sense thing to do. Because the reality is that solar and wind can't possibly power the economy. It is a total fallacy to believe that that can happen.

But I can tell you just with a few statistics, it takes 3 to 4 more times more land to power the same amount of energy for solar than it would for nuclear. Just, for instance, from a capacity standpoint, solar and wind operate at about 30 percent. Nuclear, gas, coal operate above 90 percent. This matters. And you also can't change this fact. It is just a basic law of physics, and it matters quite a bit.

We talk about environmental justice all the time but what about energy justice? What about the right of people to have power when they need it? So dedicating incentives and regulatory changes only towards solar and wind, I just—I am not sure it will be successful. I am not sure it makes any sense. And it certainly won't create jobs the way that many of my colleagues have proposed.

So, you know, why are we against the carbon capture credit is what—you know, we say it is too harmful because, well, you are still pulling fossil fuels out of the ground. But, again, is the goal to reduce carbon emissions globally or is the goal just to push a very specific industry in the United States?

And now the argument has been made that that industry creates jobs, like these tax incentives will create jobs, but here is the thing—and, by the way, the Washington Post had to fact-check John Kerry for making this claim, that solar and wind jobs were the fastest—some of the fastest growing in America. Well, by a percentage growth, yes, but by absolute value, almost no growth whatsoever. We would be losing hundreds of thousands of jobs. We lost 800,000 jobs in the past year in the oil and gas sector just because there was a dip in demand, and that is how sensitive this job market is.

So, you know, it is also worth noting on average solar and wind jobs pay \$20,000 less than an oil and gas job. So if you wanted to create a lot more jobs, and especially manufacturing jobs and good-paying ones, we would build more nuclear plants. We would build more nuclear plants, and we would build more carbon capture stations. We have private companies that are really willing to invest in that.

I get briefs on it all the time, especially in the Houston area. You could have massive effects on carbon reduction with this. You can have massive effects on carbon reduction with exporting more of our natural gas because we burn it cleaner and we produce it cleaner than any other country in the world. But if we give that up and global demand for energy keeps going up, as it will, well, Saudi Arabia, Iran, and Russia will meet that demand, and they will do it with much dirtier energy.

Let me see how much time I have left here. Very little.

Okay. Mr. Powell, can I ask you a quick question? Depending on the other climate solutions proposed, could jobs gained through a tax incentive just be lost through additional regulatory actions?

Mr. POWELL. Well, first, thanks, Congressman Crenshaw, for your leadership across these issues, your support of the Energy Act last year, your leadership on carbon capture and geothermal and regulatory reform. I do think we should remember, to your point, that the incentives we put into the system are also dependent on having a permitting and regulatory system such that those incentives will actually allow us to build in a timely fashion all of the things that we want to build.

And so it is very, very sensitive on the other end to having, for example, NEPA processes that actually allow timely environmental impact statements and yes-or-no answers to actually cite and permit things on an expeditious timeline. Or regulations to safely store and site carbon capture permits and facilities and pipelines.

And so we can't leave out the really important process of reforming and streamlining our regulatory processes so that we are not kind of pushing on a string. Right? We are not putting more incentives in and spending more but actually not getting a lot of projects actually out of the back end as a result of those incentives.

Mr. CRENSHAW. Thank you. I am out of time. I yield back.

Ms. CASTOR. Thank you.

And, Mr. Crenshaw, I know you joined the committee this Congress. I recommend to you you go back and read the section of our Solving the Climate Crisis Action Plan where we have a significant section on carbon capture and storage with a lot of good recommendations that I think can provide some bipartisan ways forward.

And we highlight the fact that, especially in the steel, cement, other industrial processes, we do not have the answers on how we are going to capture carbon and how we need to invest in R&D there, and I think that this could be an area of bipartisan agreement moving forward. So I recommend that to you.

And next we will go to—before we go to Representative Casten, if you all haven't seen his riffs on the House floor on social media on Hot FERC Summer, I recommend those to you as well.

So next, Rep. Casten, you are recognized for 5 minutes.

Mr. CASTEN. Thank you, Madam Chair. I will not be rapping today, much to your displeasure I am sure. I really appreciate you all having this hearing.

As you have heard me say many times before, getting to a clean energy economy is synonymous with getting to a cheap energy economy. And with the exception of carbon capture and storage, which is a total economic boondoggle, we are going to get to that. Every clean energy technology we have has a lower operating cost than the technology it displaces, and I wish that wasn't partisan.

My goodness. I am getting exhausted hearing my friends across the aisle say that what we need to do is to subsidize energy sources that are slashing their prices and losing market share.

I don't know what that is, but it isn't capitalism, so let's talk about markets. Let's talk about the challenges of deploying low-cost technologies, getting them through that valley of death, and we did that with Title XVII of the Loan Programs Office in the ARA and was actually hugely successful, deployed over \$30 billion. You know, there is a lot of hype around some of their losses, but I think they have generated \$3 billion in interest revenue and only had a billion dollars in losses. We need to be expanding that program.

In my prior life I actually participated in that program, and one of the challenges that we still never fixed is that when that program was set up, Congress in their wisdom, lack thereof, said that the credit subsidy would have to be paid essentially as an added fee so that what happened was that while we set this out to say let's provide lower cost guaranteed debt to help these companies come forward, what we effectively did was increase the equity participation in those programs.

I wasn't sure who I was going to ask my next question to, but, Ms. Lipman, I see you nodding your head. And briefly, because I want to get to a couple of things, but would you confirm that that

is a problem, or would you disagree because it looks like you have got some experience there as well?

Ms. LIPMAN. Yes, I agree, and I think there is a huge opportunity to address that particular issue, but also to more broadly utilize the loan programs, the manufacturing loan programs, and the grant authority of DOE to get at exactly what many folks have been talking about here, moving these technologies through commercialization into full deployment and particularly in the industrial sector where we have a tremendous opportunity to reinvest and transform—

Mr. CASTEN. Okay.

Ms. LIPMAN [continuing]. As well as across clean energy and clean energy manufacturing.

Mr. CASTEN. I am sorry.

I totally agree, and I was pleased we actually voted on the floor last night, we had an amendment that myself and Representative McEachin put in to start the process of eliminating that credit subsidy so that we can actually use the program, as I think Congress intended, to provide a lower cost source of capital to these technologies.

Ms. Andrade, one of the ideas that we have been kicking around is that the U.S. buys about \$8 billion of appliances every month, and I think LMI communities are about half of that number. If we could fix the credit subsidy problem, is there any reason we couldn't use that program to essentially provide low-interest financing to help LMI communities accelerate their acquisition of energy-efficient appliances that are going to leave more money in their pocket every time their rent comes due because they don't have to pay for energy? Structurally can we do that?

Ms. ANDRADE. Thank you, Representative.

I think that you could definitely do that, and, again, it is one more layer that would benefit this transition to clean energy economy. We need all of the tools in the toolbox, and you are talking about appliances. One of the things that is interesting to note is that in LMI communities, a lot of times there is this, like, sharing of old appliances, where, you know, when an old appliance doesn't work well anymore, they pass it on to a neighbor, and this really creates tremendous inefficiencies, and it is a huge cost for community members, households, but also they are high carbon-emitting appliances.

So, yes, we should work at this level where tax credits can incentivize the switch out of these old inefficient appliances with new technologies that are low carbon emitting and more efficient. So that is one layer, but that still doesn't solve the whole problem.

Mr. CASTEN. I am sorry because we are tight on time, but I would love to do that, and I would love to work with this committee to do it because I think we need to expand the actual authority on the renewable and efficiency part of this ultimately do that, but I think that there is an opportunity.

Just lastly, I want to close on CCS. Mr. Powell, should we be using the 45Q program to accelerate the release of carbon dioxide into the atmosphere?

Mr. POWELL. We should be—can you repeat the end of that question?

Mr. CASTEN. Should we be using the 45Q program to accelerate the release of carbon dioxide into the atmosphere?

Mr. POWELL. No. And the 45Q credit obviously does the opposite.

Mr. CASTEN. Then let's—for goodness sake, let's stop subsidizing enhanced oil recovery. Pumping low density gases underground to accelerate the release of high density sources of carbon does not release CO₂ into the atmosphere. It is a boondoggle. We need to stop pretending that 45Q doesn't need massive restorations.

I am out of time. Thank you. Yield back.

Ms. CASTOR. All right. Next up, Ranking Member Graves. You are recognized for 5 minutes.

Mr. GRAVES. All right. Thank you, Madam Chair.

Madam Chair, I would like to start and yield 30 seconds to Mr. Crenshaw.

Mr. CRENSHAW. I thank the gentleman from Louisiana, and I thank the Chairwoman for expressing the bipartisanship that can exist on carbon capture and utilization; but I have to point out that all of the environmental justice literature is completely against carbon capture, and Representative Casten just spent his entire time calling it a boondoggle. Okay.

So this is why I express that there is actually disagreement, and to the Chairwoman's point, I think there can be agreements, and I would like us to get there.

I yield back.

Mr. GRAVES. Thank you.

Madam Chair, I wasn't planning on doing this, but I do think that Mr. Crenshaw's earlier line of comments are appropriate.

We are talking about science, and we are being asked to follow the science. Yet as we are witnessing right now, we are being asked to wear masks again, but then the same leadership or the folks that built a plexiglass chamber on the House floor to actually allow for COVID positive people to come into the House chamber, and as we know, there is no pathway you can walk without walking through the Capitol and sharing your germs with everyone, and that was done solely for a political purpose of electing Pelosi Speaker. It is the same party that without any threat assessment, without any threat assessment at all, is diverting 12 or 15 officers, as long as we are in session, to the House floor whenever U.S. Capitol Police is actually understaffed, and the threat is truly on the outside.

And so I think Mr. Crenshaw's line was exactly right, and that it is really hard in some cases to think that folks are operating in good faith and truly on science whenever they just use it when it is convenient.

Now, I want to pivot back to the topic of this hearing.

Mr. Larsen, I want to understand something. You responded to a question a minute ago where you said that the best way—and I think you were referencing Mr. Powell's comments as well, the best way to bring down costs is through deployment. I said in my opening, we have had solar and wind for decades now. I have heard Mr. Casten and others talk about how it is the most affordable source of electricity. But then in your testimony you said we need to extend and expand the ITC and PTC.

Can you help me understand that quickly, please?

Mr. LARSEN. I will be happy to, and it is a great question.

Essentially, in the absence of any other deployment policy to decarbonize the electric power sector, tax credits can do a lot to meet that same goal. Right? So if you don't have either some sort of EPA regulations or clean electric standard or some other policy driving decarbonization, then tax credits are a tool—

Mr. GRAVES. But why do you need them if it is already the most affordable? I mean, shouldn't the market drive you to that solution if it is the most affordable? What am I not understanding about?

Mr. LARSEN. I mean, one key nuance there is the most affordable new generation, there is a lot of existing natural gas with no carbon capture on it that is just as competitive as the new renewables, and it is already built and it can run. Right?

Mr. GRAVES. So when you say or when folks say it is the least expensive, they are talking about just operating? They are not talking about the actual Capex and everything else that goes into it? Is that—

Mr. LARSEN. No. I think what they are saying is when you build something new, renewables are the cheapest option; but than doesn't mean when you are dispatching the grid, it is always the cheapest thing to go. In fact, there is 400 gigawatts of gas combined cycle units that can run quite cheaply on very low variable [inaudible] fuel cost. Right?

And so—and all of that emits. And so that is the other key challenge here that when it is—

Mr. GRAVES. Thank you.

Mr. Powell.

Mr. LARSEN. Yes.

Mr. GRAVES. The United States being able to take advantage of clean energy technologies to utilize our resources is important. Can you talk about the global importance of development of technologies, including more important affordable technologies that allow the developing world to have reliable low emissions?

Doesn't it make sense that we develop the technology in the United States and then export it to India and other developing nations?

Mr. POWELL. Absolutely, Congressman Graves. And, again, thank you for your leadership across these issues and particularly your focus on permitting reform to get clean energy built faster.

I think this global picture has two fundamental pieces. One, very quickly in response to Congressman Casten's last point, we have to remember we are in a global market for commodities like oil. So if we use enhanced oil—CO₂-based advanced oil recovery here in the United States, that is offsetting another barrel of much dirtier oil produced somewhere else in the world, for example, in the Russian arctic.

So we are actually lowering global carbon dioxide emissions even though we are using it to produce another barrel of oil here in the United States. Very, very important point, it is a little sophisticated point, about how global oil markets work, but a really important one to remember.

Similarly, on the global technology market, we need to remember we are in a race with a number of other very aggressive countries globally to supply the rapidly developing world with the power

plants and the industrial equipment that they are going to use to develop and modernize.

A lot of the other players in that race, China in particular, talks a good game about climate change but doesn't necessarily prioritize selling clean energy technologies to those developing markets. In fact, through the Belt and Road Initiative, they have been very happy to heavily subsidize, finance, build, and supply even really inefficient subcritical coal technologies, things we wouldn't allow to be built in the United States today because they are so inefficient and so polluting on so many dimensions.

So we have got to remember that we are up against really tough competitors globally. We need better solutions. We need cheaper, higher performing solutions, and we need packages of incentives like the support of the Export Import Bank or the Development Finance Corporation so we can actually go head to head with what China is offering to the developing world and change their emissions trajectory.

Mr. GRAVES. Great. Thank you, Madam Chair. Thank you for allowing a little extra time there, and I do—I just want to say I think Mr. Crenshaw's comments about, look, the only way we are going to get anywhere is us working together, and I think that there is some—some, as you and I have discussed, plenty of areas where we do agree, and it is important for us to get back together to work together to achieve some of these mutual goals.

Over. I yield back.

Ms. CASTOR. Yes. I trust we are going to have those opportunities shortly if some bipartisan packages come over from the United States Senate soon.

So next we will go to Congresswoman Escobar. Good morning. Welcome. You are recognized for 5 minutes.

Ms. ESCOBAR. Good morning, Madam Chair, and thank you so much for having this hearing for us and bringing us together this morning. And to our panelists, thank you so much for all that you have shared so far and for the work that you are doing. I am really grateful for it.

I want to begin with a very general question, and then I want to dive into some specific questions as they relate to my community. But, Mr. Larsen, you began your comments kind of laying out, you know, very clearly some specific tasks that Congress could accomplish, and in that spirit of what you shared with us, what I would like to ask our other panelists is a couple of quick—what is some low-hanging fruit that you think Congress immediately can jump on to achieve some quick wins? Because my belief is that having some easy, quick wins on climate builds momentum, and with that momentum we are able to then begin to tackle some of the more difficult conversations, which you all have witnessed here during this hearing today.

But if I can start with Ms. Lipman, low-hanging fruit, easy wins that you would tell us to get to work on immediately?

Ms. LIPMAN. Manufacturing conversion grants. We have such an opportunity to invest in companies that want to move into clean technologies of all kinds and may be faced with changes in the market they can't respond to now and ways that save jobs and save

good jobs, and it is a great opportunity to help folks move into these sectors and keep jobs here in the U.S.

Ms. ESCOBAR. Thank you.

Ms. Andrade.

Ms. ANDRADE. Thank you.

Yes, some low-hanging fruits would be to increase funding for the existing weatherization insulation programs, so-called WAP, LIHEAP, but also just provide funding to green banks that are in existence so that they can capitalize and catalyze and leverage those funds so that instead of just having a certain amount in these programs, we actually have eight or ten times more.

So that, coupled with—honestly, I think that we have to include a climate resiliency tax credit along with the solar tax credit or any other tax credit so that we motivate energy efficiency as a first step. That is the low-hanging fruit, energy efficiency and resilience, and then all the other technologies especially for LMI communities.

Ms. ESCOBAR. Thank you Ms. Andrade.

Before I head to Mr. Powell for any low-hanging fruit suggestions he has, you essentially identified what I was going to be asking you about. I represent an economically disadvantaged community out in the middle of the Chihuahuan Desert where we suffer frequently from severe drought, and then we sometimes swing over to extreme flooding; but many of our families are unable to really protect themselves against the extreme heat because of lack of access to weatherization for their own homes. So I may get back to you if we have time on that issue in just a sec.

Mr. Powell, low-hanging fruit, quick ideas?

Mr. POWELL. Pass the Energy Sector Innovation Credit. It is bipartisan. It is bicameral. It has support from leadership in both Senate Finance and House Ways and Means. It is poised for passage. It would put all advanced clean energy generating technologies on an equal footing with a leg up to get those into the market and deployed quickly and lower the cost so we would have a whole portfolio of things to use here in the United States and export to the developing world.

Ms. ESCOBAR. Thank you.

And, Mr. Larsen, anything you want to add as a footnote in the great list that you gave us during your remarks?

Mr. LARSEN. I think I would just reiterate a couple of key components. One is allowing credit flexibility so, you know, a technology or a developer could choose either the ITC or the PTC is really important to actually broadening the scope of opportunities for investment across America and also can really hyper charge deployment by doing so. And I think just that tweak to the existing tax credit framework would be quite impactful.

Ms. ESCOBAR. Great. Thank you.

And I have probably only 30 seconds. Ms. Lipman, I want to ask you a quick question. In my community, the El Paso Chamber of Commerce is working with our university and our electric utility on a model that ensures that vehicle batteries can plug into the grid and sell excess energy back to the grid. They estimate that it could mean an additional \$500 income for consumers who own an electric vehicle.

How can Congress support more of these kind of vehicle-to-grid models?

Ms. LIPMAN. Sure. And in 7 seconds I would say there are numerous tools. It is an exciting opportunity to both use our tax credits and grants, but also the public sector, the infrastructure funding that would allow both households and things like schools systems and municipal bus utilities to create both—bring in the electric vehicles, but also create this vehicle-to-grid or vehicle-to-building resilience assets that are there in times of a disaster, but also provide the return to the school system, to the community through the utility services.

Ms. ESCOBAR. Thank you.

I am so sorry, Ms. Andrade, we can't finish our conversation. I am out of time.

Madam Chair, I yield back.

Ms. CASTOR. Thank you very much.

Well, I am going to make sure you all get together after the hearing to make that connection.

Next up, Rep. Levin. You are recognized for 5 minutes.

Mr. LEVIN. Well, thank you, Chair Castor. I am grateful that we are holding this hearing on such an important topic.

You know, since I came to Congress in 2019, I have been fighting for the passage of a comprehensive clean energy and clean transportation tax package that will put our country on a path to a sustainable future. That package would drastically reduce greenhouse gas emissions so we can address the climate crisis that study after study tells us that we face.

In April of 2019, I co-lead a letter signed by more than 100 of our House colleagues calling for the inclusion of these sorts of policy and the always just around the corner infrastructure package under the prior administration. And we saw and continue to see these clean energy tax policies as a way that our country can combat the climate crisis, grow our economy, and create good jobs all at the same time.

Unfortunately, the infrastructure package often discussed under the previous administration seemed to be more about scoring political points and less about actually creating jobs for our constituents, so it never materialized. But this administration, President Biden has revitalized these infrastructure efforts with the American Jobs Plan where he calls for an expanded investment tax credit and production tax credit for clean energy generation and storage, along with significant incentives to facilitate electric vehicle adoption and charging infrastructure.

I share his vision. Many of our colleagues do as well. And earlier this month, I was really pleased that 133 other members signed a letter of support calling for the climate provisions in the American Jobs Plan. We called for the adoption specifically of a robust 10-year clean energy and transportation tax title as outlined in the President's proposal.

A key part of that, making sure that the clean energy tax credits were made eligible for direct pay, particularly important as we continue the economic recovery from the pandemic which has made it more challenging to finance clean energy projects. I introduced last Congress the bipartisan Solar Jobs Preservation Act with Rep-

representative Schweikert to temporarily create a direct pay option for solar projects that were able to break ground by the end of 2021. They extended the phase down of the tax credit scheduled by 1 year. And then this Congress Earl Blumenauer and I built on that by introducing the Renewable Energy Investment Act to allow either the PTC or ITC to be taken as a direct payment rather than a tax credit. I continue to believe these policies are critical to our effort to build more clean energy projects.

Mr. Larsen, I will turn to you for a couple of questions. Your testimony recommends that Congress provide a direct pay or refundability policy to prevent financing bottlenecks that could constrain clean energy deployment. And I know that Rhodium has done a lot of good work in this space. Please say hi to my friend, Trevor Hauser, if you get a chance.

Mr. LARSEN. I will.

Mr. LEVIN. Could you elaborate on the bottlenecks that clean energy development could face and how direct pay specifically could address them?

Mr. LARSEN. Yes, absolutely.

So essentially, you know, as you know, you need some sort of tax appetite to monetize the current tax credits the way that the current framework is set up without direct pay. It turns out there is a finite pool of capital available to help finance projects that are eligible for these tax credits.

In 2020, in the renewable energy sector, the U.S. had record deployment of wind and solar and also saw basically a tax equity market hit its functional limits. People—you know, we hear multiple reports of folks either not finding financing or were finding very expensive financing because of those constraints.

We see just in renewables alone a doubling of that capacity, of those capacity additions, up to 60, 65 gigawatts a year if we are going to get to the clean energy goals we need to see, and there is just no reason to believe that tax equity is currently set up to meet that challenge, especially if you would then expand to carbon capture, to EV charging, to all the other technologies that are going to matter here. And so basically a direct pay removes that constraint. It broadens the available capital available to monetize these tax credits and really connects an array of investment across all of these sectors and all of these technologies.

Mr. LEVIN. Could you expand on—I know we all have this goal, 500,000 EV chargers, and there has been proposals back and forth, most recently \$7.5 billion in the bipartisan infrastructure deal as announced yesterday. But do you have any thoughts on how direct pay could help us achieve the goal of 500,000 EV chargers?

Mr. LARSEN. Yes. I mean, in any kind of, like, infrastructure investment, like EV charging, there is a long-term game being played. Right? You are building for the demand you anticipate down the road. What that means is that in the immediate term, there is less of a revenue opportunity and less tax equity and tax appetite for the developers. Right? Because they just don't have all of the revenue they need down the road, and direct pay allows those same investments to happen absent that profitability concern in the near term and really can allow folks to kind of remove some

of the risk of investing in these technologies in the near term and really build things out.

That is a key part, component of this.

Mr. LEVIN. Thanks, Mr. Larsen.

I am out of time, but I hope that everybody takes a look at direct pay. It is good bipartisan policy.

And, Madam Chair, I yield back.

Ms. CASTOR. Thanks, Rep. Levin.

Next up, Rep. Carter, good to see you. Good morning. You are recognized for 5 minutes.

Mr. CARTER. Thank you, Madam Chair, and thank all of the witnesses for being here. This is certainly a much needed discussion.

But I really want to thank Mr. Powell for being here and for your comments, Mr. Powell, on what I think is the heart of the issue with the Select Committee, and that is global emissions. And, you know, when we talk about that and reducing global emissions, particularly while we strengthen the U.S. economy and not allow China and Russia to dominate energy development around the world, and I think there is bipartisan agreement that we need to invest in the innovation of clean technologies; but I am convinced that we can do that and still grow our economy at the same time.

However, there are some of those who differ in what kind of innovation is acceptable, and we need to concentrate on innovations in the U.S. interest and that maintains our energy security and brings down global emissions.

The key is global emissions. We do not live in a vacuum here. It is not just the United States. It is the whole world that is contributing to this and even more so other countries than it is the United States of America.

I want to talk about carbon capture, Mr. Powell. The Department of Energy announced last year that they were funding two cost-sharing projects in Georgia with Georgia Tech and the Southern States Energy Board. Georgia Tech is researching direct air capture technology under realistic conditions for global deployment, while the other project by Southern States Energy Board in Peachtree Corners is targeting reducing the overall cost of direct air capture.

Mr. Powell, are there any encouraging developments in direct air capture technology?

Mr. POWELL. Well, first, thanks so much, Congressman Carter. Great to see you, and thanks for your leadership on these issues, on supporting the Energy Act and your support for nuclear energy. It was terrific to see those grants go to the great State of Georgia for research into this really important technology. There are some extremely promising developments in this space.

I think we should all remember that a lot of folks are setting goals around net-zero, and that means that in the future we might still have some parts of our economy that continue to emit. For example, it would be extremely expensive to stop the emissions in that space; but as long as we net them back out with some kind of carbon dioxide removal or direct air capture, that is just fine. Right? The climate only cares about the net emissions, right, not the absolute emissions. So direct air capture could be a really promising technology that would be a mechanical removal of CO₂

from the atmosphere. Some models show that we are going to have to do that at an enormous scale, maybe billions of tons in the future, and so we need to be investing now to radically bring down the cost of that technology.

There are now a number of companies that are actively working on it and even ready to deploy this technology in the United States. I think the largest project and the one that is probably the most promising is Carbon Engineering's proposed project in the Permian Basin where they are working with Occidental Petroleum. They are going to remove CO₂ from the atmosphere at enormous scale, up to a million tons a year. They are going to put that underground and use it for enhanced oil recovery, and that will actually—

Mr. CARTER. I think he froze. I am sorry for that.

But if it is okay, I don't mean to interrupt you, but I am going to go ahead because the clock is ticking, and I really want to get to this, and what it is about is it is about carbon capture and—I am sorry, you froze there, Mr. Powell, but I want to get to this, so please allow me if you will.

Georgia—and this will be the first time I have ever said this before this committee, but Georgia is the number one forestry state in the country, and certainly growing trees can sequester more carbon dioxide than the annual U.S. emissions from passenger vehicle travel, forest products, manufacturing facilities, forest harvest operations, and estimated wildfires.

What can we do to further incentivize carbon capture through our nation's forests?

Mr. POWELL. So natural climate solutions, particularly the forestry space, I think are a really important part of this picture, and the most promising thing would be if we could find a way to use those to sequester that CO₂ in those forests and forest products and then to either permanently use them, for example, in building materials, so that never goes back up into the air or use some of those forest products for bioenergy, and combine that with carbon capture and storage, that actually creates negative emissions power generation—

Mr. CARTER. Right.

Mr. POWELL [continuing]. Which would be a hugely important way in the future to both continue having a clean energy generating economy and to be pulling CO₂ out of the air as we are doing it.

Mr. CARTER. Okay. Just a few seconds left.

Why don't we use more biomass in this country?

Mr. POWELL. That is a great question.

I think that there is some disagreement about the carbon impacts of biomass. I think there is no disagreement that if you combined it with carbon capture, we would actually have negative emission, you know, power generation, and that could be a really powerful tool in our clean energy arsenal.

Mr. CARTER. Great. Thank you, Mr. Powell.

And thank you, Madam Chair.

Ms. CASTOR. Thank you, Rep. Carter.

Well, thanks to our witnesses today. You all have been terrific, provided very insightful constructive testimony, so thanks again.

Oh, okay. Before—Gary Palmer makes it under the wire. So, Rep. Palmer, you are recognized for 5 minutes.

Mr. PALMER. Thank you, Madam Chairman. I was unavoidably delayed.

Mr. Powell, I think some of this has been discussed already, but it was noticed by a witness from our last hearing that studies showed that an estimated 90 percent of electric vehicle owners earn over \$100,000 a year, yet somehow my Democrat colleagues think we are going to be able to provide every American with an electric vehicle.

Do you think giving wealthy individuals thousands of dollars to buy a vehicle that they can clearly afford is a good use of money?

Mr. POWELL. You know, I think the thing we need to remember about electric vehicles is that they are only as clean as the power grid that supplies them with power. Our argument would be that the highest and best use of public funds would be making sure that there is a clean grid in the first place to power those electric vehicles, and I think at a ton per ton of carbon dioxide emissions reductions, in most cases it is more efficient to put incentives and resources into making the grid cleaner than to incentivizing the purchase of the EVs.

Mr. PALMER. The cost of making the grid cleaner—and they are pushing for a uniform grid which would basically replace the existing grid—could run into the trillions of dollars, and that is eventually going to be passed on to everybody in the form of higher energy costs, perhaps even taxes and fees, and it will be particularly hard on low-income families. I grew up basically dirt poor, so I understand this. We heated our house with a coal heater that sat in the kitchen.

Does that concern you?

Mr. POWELL. Well, Congressman Palmer, I think that this is the reason that we need to think about not radically changing and transforming our grid but doing everything we can to use the existing grid and the existing infrastructure and the existing assets. That is preserving our existing nuclear plants. That is finding ways to retrofit as much of our existing coal- and gas-fired power plants with carbon capture technologies as we possibly can. So that is finding ways we don't have to tremendously overbuild our grid or tremendously overhaul the transmission infrastructure but try to keep the costs low.

Mr. PALMER. I am one of these all-of-the-above, but when you talk about—I am talking about they want to replace the grid. If we maintain the grid that we have, which is a patchwork grid, then we have got to come up with some kind of technology that can store power, energy for days, and that technology doesn't exist right now. And the grid requires a consistent baseload.

So if we have this grid, it is going to have to be backed up with some other form of fuel, whether it is nuclear or natural gas. I literally had a Democrat witness recommend using natural gas to back it up, which would require the laying of new pipe.

Mr. POWELL. So we absolutely need flexible and baseload zero-emitting sources for a low-cost, low carbon power grid in the future.

Completely agree with you that energy storage is also a big priority there. I think there has been some really interesting advances

in those technologies. There was actually one announced just last week. Forum Energy believes that it has made a breakthrough in very long duration energy storage technologies that would be 90 percent cheaper than today's battery technology and get around a lot of the really problematic sourcing of critical minerals from China and some of our other geopolitical competitors globally by using iron, which we could source here domestically in the U.S., so—

Mr. PALMER. We have got to address the whole issue of the minerals as well, but you have a pretty good understanding of what it will take to build out this grid. My Democrat colleagues think that we only have like 9 years left to get it done. Can we get it done in 9 years? Can we do everything that you want to do in 9 years? Are we doomed? Are we doomed?

Mr. POWELL. We—

Mr. PALMER. I mean, is this all just an involved fantasy?

Mr. POWELL. We are not doomed. We are not doomed. We do have—

Mr. PALMER. Do you all think we only have 9 years left to get it done?

Mr. POWELL. I do not. So climate change is, I think, best thought of as a chronic condition for the planet. I think that is the better way to think about it than an emergency. It is something we are going to have to deal with for decades, if not centuries, and we have got to marry—

Mr. PALMER. Let me cut you off there because I have only got a few seconds left.

It is something we are going to have to deal with as long as humankind exists because the history of climate change is in the geologic record, and it is not necessarily related to the emissions of CO₂. CO₂ certainly has an impact on it; but in the short term and the long term, in terms of climate change, what we have got to address is natural variation. We are not doing that. And with all due respect to all of the witnesses, this idea that we are going to stop climate change by building a renewable grid, clean energy grid, that is fantasy.

I yield back.

Ms. CASTOR. All right. Well, I want to start—I wanted to end where I started today, and that is the need to cut carbon pollution as quickly as possible. We are all witness to the rising harms, the escalating costs, and we have got to do everything in our power to avoid the catastrophic impacts of the climate crisis. It is not some political imperative. It is a scientific imperative. And it is our moral obligation to our kids and our grandkids. And, fortunately, we can tap American ingenuity to help solve the climate crisis, and that is what we intend to do. We have made progress, but we have the technologies now to go farther and help deploy them, as all of the witnesses said, globally.

This is what America does best. We research, we develop, we deploy, we share, and we sell to the rest of the world, and that is what we need to do. But we need Federal policies here, tax credits, creative financing policies to help get us there, and that will benefit workers. It will benefit our neighbors back home. It will make the

air we breathe cleaner, and it will lift everyone all across this country.

So thanks again to all of our witnesses for being here today.

Without objection, all members will have 10 business days within which to submit any opening statements and additional written questions for the witnesses. I ask our witnesses to please respond as promptly as you are able.

Thanks again, everyone. The committee is adjourned.

[Whereupon, at 10:53 a.m., the committee was adjourned.]

**United States House of Representatives
Select Committee on the Climate Crisis**

Hearing on July 29, 2021

“Financing Climate Solutions and Job Creation”

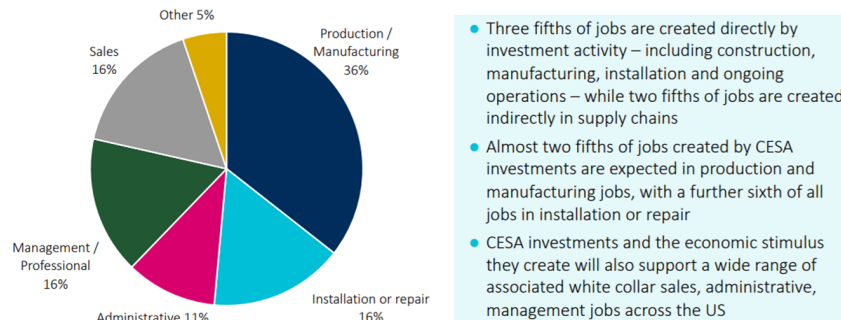
Questions for the Record

**Duanne Andrade
Chief Financial and Strategic Officer
Solar and Energy Loan Fund**

THE HONORABLE KATHY CASTOR

1. Ms. Andrade, could you please describe how a Clean Energy and Sustainability Accelerator could help create local jobs in communities across the country?

If funded with the \$100 billion capitalization envisioned in Rep. Dingell’s H.R. 806, the Clean Energy & Sustainability Accelerator is projected to deliver 440,000 jobs in its first year, and over five and a half million jobs within its first five years according to an independent analysis from Vivid Economics.¹ The chart below shows the distribution of job categories projected from Accelerator investment.



The Coalition for Green Capital identified more than a hundred types of jobs directly created with an Accelerator, from aerospace and marine engineers to roofers and welders, and found real-world job postings for each category.² These job types range from requiring no college degree to PHD, and the average salary was \$73,853.

In terms of local job creation, my organization (the Florida Solar & Energy Loan Fund—SELF) has over 700 approved contractors in our network. They’ve told us that without SELF, they’d lose anywhere between 20 to 40 percent of business due to clients lacking access to financing. One of our contractors, SEA COAST a local mom-pop shop in Fort Pierce, Florida has financed 200 projects worth over \$1 million with SELF.

¹ <https://coalitionforgreencapital.com/wp-content/uploads/Accelerator-Impact-Vivid-Economics-11.22.20.pdf>

² <https://coalitionforgreencapital.com/wp-content/uploads/Accelerator-Impact-Vivid-Economics-11.22.20.pdf>

Another one, Westfall Roofing, in a recent interview with The Invading Sea, said that without SELF financing, many people would not be able to fix their homes. They have grown their market and increased business with SELF financing.

2. Ms. Andrade, could you please describe how homeowner investments in energy efficiency, renewable energy, and resilience upgrades can be complementary and can help homeowners save money?

As a mission-driven, non-profit green bank, the Solar and Energy Loan Fund (SELF) provides financial inclusion, low-cost financing, and project management to help low- and moderate-income (LMI) homeowners overcome the high upfront cost of energy efficiency, resilience, and renewable energy upgrades, such as: high-efficiency air conditioners; fortified roofs; and, rooftop solar photovoltaic (PV) systems. These sustainable home improvement projects go hand in hand to enhance benefits for homeowners that include: energy savings (high efficiency A/Cs and Solar PV systems); increased safety from climate impacts (storm resistance with fortified roofs, impact windows and doors); lower utility bills (with water conservation upgrades); and improved health and safety for aging in place (ancillary disability home adaptations). The array of improvements that SELF finances ultimately increases climate resilience which results in the preservation of generational wealth, the home; and the sustainability of our environment, through transforming our homes to low-carbon, weather resistant homes.

SELF helps homeowners through the process of going all the way to net-zero when possible by encouraging a step by step approach that maximizes savings and benefits. For example, if a home is not weatherized and sealed, SELF encourages the homeowner and contractor to add this to the project to be financed with the new high efficiency air conditioner. Once the home is sealed and has reduced energy demand through energy efficiency upgrades, the next step is to replace the energy source with a clean source by going solar or using other renewable sources. In Florida, solar is the most appropriate source of clean energy and has the potential to save up to 100 percent of the energy cost. These benefits can be further enhanced by homeowners having access to solar plus battery storage which would provide increased safety and health benefits during climate events that cause power outages—which are increasingly frequent. In order to obtain maximum economic and social benefits, these upgrades would be paired with fortified roofs that have the highest wind code to withstand storms and protect the lives and assets of residents. With higher wind resistant roofs homeowners increase climate resilience and safety, and also significantly reduce insurance costs. In many cases homeowners are unable to qualify or simply can't afford insurance due to the home having older roofs and windows which don't meet the minimum standard required by insurance.

An integrated approach to clean energy and resilience is the only way to ensure a sustainable path to low carbon, sustainable communities. Resiliency upgrades (i.e., fortified roofs, impact windows and doors), help our homeowners save money by lowering their insurance costs, reinstating them to insurance coverage, and by protecting what's often the only asset owned by the low-to-moderate Americans we serve. Energy efficiency upgrades save homeowners money by ensuring energy does not wastefully slip through a leaky window or cheaply built roof. Renewable energy saves our homeowners money by producing energy more cheaply than traditional energy sources and allowing for climate-emergency response with backup storage.

However, these higher standards of homes call for upfront investments that are unaffordable, especially for many vulnerable low-and-moderate income homeowners living in older dwellings with limited or no access to affordable and flexible financing options.

SELF has been working at the grass roots level in LMI communities for a decade now and since the beginning we listened to the needs of homeowners and to the challenges they faced to life in safe, healthy and affordable homes. We understood the benefits of pairing wind resistance with energy efficiency and clean energy early on when we observed that homeowners needed to fix their roofs before they could even consider solar energy- and that in order to maximize savings and social benefits, we needed to provide a path to transition to clean energy and that meant making the home solar ready by addressing the envelope, sealing, weatherizing, fortifying roofs, installing energy efficient appliances and then transitioning to solar energy. By addressing the home as an ecosystem and combining these upgrades, homeowners can unlock significant savings in insurance costs and reduce or eliminate energy costs altogether which frees up a significant proportion of their income spent on energy, utilities and insurance. Finally, by combining these upgrades, homeowners also increase the equity in their homes, maximize safety and preserve and protect generational wealth in their homes. That is why we created loan prod-

ucts to finance the full spectrum of home improvements to unlock savings with quality of life benefits.

Climate resilience and clean energy need to go hand in hand to maximize economic, social and health benefits not only to residents but to communities as a whole. This combination reduces potential losses during climate events (saving tax payers dollars in emergency funds like FEMA), while transforming neighborhoods and communities into sustainable, affordable, low-carbon, safe and healthy places to thrive in- today, and in the future.

In order to produce this transformation what is needed is: financing. We need inclusive, equitable capital to deploy in all communities, especially, disadvantaged communities. There is expertise and technology ready to be deployed.

That is why funding for an independent, nonprofit Clean Energy & Sustainability Accelerator is so critical to the transition towards a clean energy economy and the achievement of broader national and global carbon emission reduction goals. The funding would allow green banks across the country to leverage private capital and help homeowners across the income spectrum participate in the benefits of a clean energy economy, especially low-income residents who are the most energy burdened.

SELF is much more than a green bank who is fostering the clean energy economy. Our lending programs and complementary services also provide: vital health benefits and quality of life to working-class families, disabled homeowners, veterans, and retirees on fixed incomes; significantly reduce operating costs, risk, anxiety and unnecessary suffering; enhance operational efficiencies, property values and generational wealth; decrease harmful carbon-based emissions and related climate impacts; and, create green jobs and support local companies. Shifting to a more sustainable and resilient economy is not a sacrifice, it's an enormous missed opportunity that can promote widespread and complementary benefits to our communities at large, the economy, and particularly those individuals most-affected by climate change. For more details on types of improvements that SELF provides financing for see Appendix A.

APPENDIX A

Common types of home improvement projects financed by SELF.

One of the most common types of home improvement projects that SELF helps LMI homeowners finance is *high-efficiency air conditioners* (e.g., 16+ SEER system), which typically reduces household energy use and costs by 20–25%. These basic upgrades generate an annual savings of \$500–600 per household per year and greatly improves their health and overall quality of life. Having a functioning A/C in Florida during the sweltering summer heat and humidity is not a luxury item for the elderly, disabled and children. The new high-efficiency A/Cs also enhance property equity and generational wealth, while cutting the carbon footprint of the household and creating local green jobs. SELF's #1 contractor is a family-owned A/C company in St. Lucie County, FL, which has completed more than \$1 million of projects financed by SELF. SeaCoast AC employs dozens of local people, pays substantial local property and business taxes, and they rely exclusively on American made products ("supply chain").

Another common project SELF finances is *roof repairs/replacement* which are not only safeguarding families and homes during hurricanes and extreme storm events, which are on the rise, but also reducing home insurance premiums by \$700-\$1,000 per year. Roof repairs and upgrades also provide additional energy savings and make the homes "solar-ready". Homes are also most often the largest family asset in LMI communities, so these fundamental repairs also provide long-term benefits as the home is passed on to the next generation. These projects also create additional work for local certified contractors and skilled craftsmen.

Finally, solar PV prices have dropped by 80% over the last decade so it is now more cost-effective to build your own rooftop *solar PV system* than it is to buy carbon-based fuels off the grid. Homeowners can save \$10,000 or more on their energy bills over the warrantied life of the solar PV system, substantially increase the market value of their homes, and re-direct the outflow of energy dollars from leaving the Sunshine State. These PV projects also dramatically reduce harmful carbon emissions and generate substantial work for local solar contractors.

Questions for the Record

John Larsen
Director
Rhodium Group

THE HONORABLE KATHY CASTOR

1. Mr. Larsen, in your testimony, you highlight some critical improvements to clean energy tax credits, like making them available for direct pay, allowing developers to choose between the Production and Investment Tax Credits, and providing a long-term full value extension of the tax credits. Given that wind and solar are abundant and affordable, why do we need to extend and expand clean energy tax credits? Can we just assume we'll meet our climate goals without them?

Wind and solar costs have come down dramatically over the past two decades. As a source of new electricity, they now represent the majority of annual capacity additions in the U.S. outpacing natural gas (EIA 2021). In the absence of a national climate policy that cuts electric power emissions, extension and expansion of clean energy tax credits can do more than just outcompete new fossil fuel-fired power plants to meet new demand. Clean energy tax credits can make new wind and solar competitive against *existing* fossil fuel-fired power plants. The capital expenses associated with most existing coal and natural gas-fired power plants are largely paid off, and these assets are fully depreciated. This means that all they need to compete in electric markets is to covering their operating costs on an annual basis. This is a much smaller amount of cost than recovering the operating *and* capital costs associated with new capacity. To date, wind and solar have largely led to avoiding emissions from new fossil fuel fired power plants. Enhanced and extended tax credits, combined with continued technology costs declines will allow the next wave of wind and solar to both displace new and existing power plants and lead to greater reductions of greenhouse gases.

2. Mr. Larsen, we will need more than public investment to meet our climate goals. How do Federal tax credits help leverage private capital to accelerate the transition to a clean energy economy?

Federal tax credits provide a stable, certain and familiar incentive for private capital to invest in renewables as opposed to conventional fossil alternatives. The incentive is large enough to entice private capital away from fossil investments and attract capital that might otherwise sit on the sidelines. Investors then get the benefit of a rate of return on the investment as well as a reduction in their tax liability. Meanwhile, more clean energy gets built around America.

3. Mr. Larsen, we know zero-emission vehicles are cleaner and cost less over a vehicle's lifetime than vehicles with internal combustion engines. Based on your work at the Rhodium Group on EV policies, could you please explain how tax credits for zero-emission vehicles would help increase deployment?

Long-term extensions of the 30D EV tax credit and removal of manufacturer sales caps cut the cost of new EVs for consumers and make them more competitive with conventional vehicles on an upfront cost basis. Previous Rhodium analysis found that a ten-year extension of the tax credit could drive EV sales to 40–52% of total light-duty vehicle sales in 2031. In a scenario, with no tax credit extension, we found that EVs only achieve 27–39% of total LDV sales in 2031.

4. Mr. Larsen, many of the clean energy technologies we need to achieve deep decarbonization across our economy are still under development. The International Energy Agency estimates that 75% of the cumulative CO₂ emissions reductions needed to shift to a sustainable path come from technologies that are in the demonstration and early deployment phase. How can Congress better support innovation and emerging clean energy technologies via the array of available financial tools, policies, and incentives?

There are four general categories of policies that can help the development and deployment of emerging clean technologies.

- First, investing in research and development (R&D) of a diverse array of new and emerging technologies. The U.S. is a leader in this space. The Energy Act of 2020 constructs and revamps clean energy R&D and the Infrastructure package contains even more enhancements.

- Second, funding the construction of large-scale demonstration projects and early commercial deployment of developed technologies. Without government support, many emerging clean technologies get to initial deployment and stall because it's difficult to attract investors to fund new and untested technologies. Government direct investment and cost-share programs, as well as tax credits, can help get new technologies off the ground at scale and reduce financial risks.
- Third, long-term commercial incentives are required to send firm signals to the market that clean technologies need to be deployed to achieve emission reductions goals. There are many forms these signals can take. Carbon pricing, regulations, clean energy standards (including clean fuel or clean product standards), and tax credits can all play a role. The key is to make the deployment of emerging clean technologies more profitable than continuing the status quo.
- Fourth and finally, non-cost barriers to clean technology deployment need to be addressed or else efforts in the first three categories won't drive change. Non-cost barriers include but are not limited to permitting constraints, access to resources, public understanding/acceptance of new technologies, access to and siting of infrastructure and other issues. The federal government has a role to play in all of these areas to allow clean technologies to scale up in a safe and responsible way.

5. Mr. Larsen, according to analysis from the Rhodium Group, in order to be on track for 100% clean generation in 2035, emissions need to be 80% below 2005 levels in 2030. This means we need to both support rapid deployment of additional clean energy technologies and ensure we don't lose any of the existing sources of clean energy available to us today. What type of support could help existing clean energy generation sources stay online in the coming decades? And can we ensure new incentives go only towards supporting displacing fossil fuels?

Due to competition with fossil fuels and a lack of valuing their clean energy attributes, some existing clean resources are at risk of early retirement by the end of this decade. For example, depending on market conditions, Rhodium estimates that nearly a third of the existing nuclear fleet could retire by 2030 without new policy support. If these plants retire, then even more new clean capacity will be needed to get on track for 100% clean generation in 2035, or fossil generation will replace it instead. A clean electric standard or clean electric performance program that provides a technology-neutral incentive to increase the amount of clean generation in the U.S. (regardless of whether its existing or new) can provide incentives to retain at-risk existing clean capacity. Targeted federal programs or tax credits that provide incentives to retain existing clean generation can also be useful tools to do the same.

Beyond the goal of meeting 100% clean generation, retaining existing clean resources also helps to ensure that all new clean generation displaces fossil generation. This is one way to maximize the climate benefits of clean energy tax credits. Without existing clean support, there is a risk that new clean will outcompete existing clean generation leading to no net change in total clean generation and no change in emissions.

6. Mr. Larsen, how can tax credits and a clean electricity standard serve as complementary policies?

Tax credits complement a clean electricity standard (CES) in a few ways. First, they shift some of the costs of complying with a CES away from ratepayers and to the federal government. This reduces the cost to consumers of decarbonizing the electric power sector. Second, tax credits can accelerate the deployment of grid improvements needed to meet high levels of clean electricity penetration, such as storage and transmission. They make it easier to achieve CES targets. Finally, they can shift CES compliance towards technologies that receive tax credits. This may be desirable if the CES is technology-neutral. Still, some tax credit eligible technologies help to meet other policy goals such as domestic manufacturing or increasing reliance on renewable energy instead of nuclear.

7. Mr. Larsen, could you please explain how the investment tax credit (ITC) has driven access to, deployment of, and innovation in solar energy? How could a long-term extension of the ITC help build on this success?

Since its inception 15 years ago, the ITC has been a critical incentive for the early and current commercial scale-up of utility-scale solar generation. Initially, solar's high cost and relatively low capacity factors made other deployment incentives such as the production tax credit ineffective at driving deployment. Over the last decade

and a half, a whole industry has arisen around the scale-up of utility-scale solar. All of it is thanks to the ITC.

While a long-term extension of the ITC will help solar continue to thrive without more comprehensive decarbonization policies, its usefulness will diminish relative to other options. Since the value of the ITC is defined as a share of the costs of developing a solar project, that value has and will continue to decline as the cost of solar declines. In high-quality solar resource areas in the U.S. today, the ITC is a less valuable incentive than the PTC because of this dynamic. The PTC is a fixed value payment based on generation. As solar costs decline, the PTC's value as a share of the total cost of solar energy will increase, whereas the ITC's value will decrease. This is why Rhodium research shows that a flexible tax credit framework that allows solar developers to choose the PTC or ITC, whichever works best for them, can lead to even faster clean energy deployment compared to simple extensions of the current tax credit framework.

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Questions for the Record

Zoe Lipman

**Director, Manufacturing & Advanced Transportation
BlueGreen Alliance**

THE HONORABLE KATHY CASTOR

1. Ms. Lipman, we know zero-emission vehicles are cleaner and cost less over a vehicle's lifetime than vehicles with internal combustion engines. Could you please explain how incentives for consumers to buy zero-emission vehicles and incentives for automakers to build zero-emission vehicles in America could be helpful?

Sufficient and targeted consumer incentives that expand and speed uptake of cleaner vehicles are important to transitioning the nationwide vehicle fleet to electric vehicles at the pace needed to achieve climate goals. At the same time, we must urgently support increased domestic manufacturing in meeting this quickening demand for EVs. Our competitors worldwide are also moving fast to capture the economic gains from this shift. If the U.S. is going to successfully meet our climate, jobs or economic goals, we will need both a supply- and demand-side approach. We will need to use a coordinated set of tools to support the domestic manufacture and deployment of cleaner vehicles, and to ensure that the shift to electric vehicles protects and creates good jobs in communities across America—together these actions are key to enabling a rapid, equitable and sustainable transition to clean transportation.¹

Consumer incentives stand to play a significant role in shaping the shift to electric vehicles, as well as the manufacturing, jobs, and community impacts of that transition. Specifically, the 30D consumer tax credit for electric vehicles should be updated (such as described in Sen. Stabenow's amendment to The Clean Energy for America Act (S. 1298)) to incentivize strong manufacturing labor standards and support domestically manufactured EVs.

By incentivizing vehicles assembled in the U.S. with greater domestic content, and vehicles built in union facilities, the consumer EV tax credit can help retain and grow the next generation of high-skill, high-wage, family-supporting jobs in the

United States, while accelerating the domestic electric vehicle production and supply chain investment and growth necessary to secure long-term U.S. competitiveness in the automotive sector. To maximize the equitable deployment of EVs, the credit should be made refundable, or ideally, available at the point of sale.

Additionally, Congress should establish a tax credit to incentivize the purchase of used EVs, which could improve access to EVs for low- and moderate-income consumers, and Congress should ensure that such a credit is similarly refundable and targeted. Similar criteria for domestic manufacturing, labor standards, and addressing equity should be applied to the 30B credit for other advanced technology vehicles.

We also support the ongoing work to expand the 30C tax credit for charging infrastructure, as robust proliferation of easily accessible charging will be essential to the success of EV adoption. Incentives for charging infrastructure should ensure availability for all communities, with a priority on filling gaps in low income, rural, and deindustrialized communities and communities of color, and availability for residents of multi-family housing, and be refundable. These incentives should also require certified training for installation of electric vehicle supply equipment (such as the Electric Vehicle Infrastructure Training Program, or EVITP) and the domestic manufacture of charging stations.

On the manufacturing side, incentives to expand and retool the domestic factories building the clean vehicle fleet of the future, and to establish and grow the domestic EV technology supply chain in the U.S. are essential to secure the economic and jobs benefits accompanying this major sector transformation. Key incentives include:

- The 48C Advanced Manufacturing Tax Credit Program.
- New production and investment tax credits for facilities in the EV supply chain.
- Enhanced funding and expansion of DOE advanced automotive loan and grant programs, including the Advanced Technology Vehicle Manufacturing (ATVM) loan program and manufacturing conversion grant programs.

48C Advanced Manufacturing Tax Credit Program: The always-oversubscribed 48C tax credit program has provided funding to over 180 facilities—predominantly in small- and medium-sized manufacturing—to establish or expand domestic production of a wide range of clean energy and industrial products, including EV components and materials.ⁱⁱ By increasing funding for the tax credits (and/or comparable grants) Congress can provide the necessary funds to establish or retool facilities manufacturing batteries and battery materials, semiconductors, inverters, motors, and facilities that process and recycle critical minerals. These tax credits should prioritize investment in economically distressed communities, deindustrialized, and disadvantaged communities.

New manufacturing production and investment tax credits: The recent global semiconductor technology shortage, and its impacts on the domestic auto sector, illustrate how our reliance on a limited number of foreign suppliers for critical components can threaten our economic security. For the growing EV market, the challenge is even greater; the U.S. lags behind its competitors in producing key propulsion system technologies. Through a new manufacturing investment tax credit (ITC) designed to fill economically critical supply chain gaps, Congress can provide key support to speed investment in establishing landmark production facilities, while a production tax credit (PTC) can aid in supporting the domestic scale-up of novel technology production. These investments will facilitate the national transition to EVs, protect and create high-quality jobs, build resilience and stability into the domestic EV supply chain, and ward off or reverse the offshoring of good jobs throughout the automotive supply chain.

ATVM: The ATVM plays a key role in spurring major auto and component manufacturers to locate their advanced vehicle and technology facilities in the U.S., rather than abroad, reducing risk as technology and markets shift. The ATVM has supported the establishment, retooling or expansion of domestic auto manufacturing facilities in eight states to build clean, fuel-efficient, and electric vehicles. The policy has sustained or created at least 35,000 direct jobs, and 200,000 indirect jobs. As the market accelerates toward EVs, the ATVM can again provide essential support for auto and manufacturing jobs throughout the supply chain, while facilitating vehicle emission reductions.

Manufacturing Conversion Grants: Conversion and retooling grants can play a key role in bringing new technology into existing facilities, and maintaining supplier networks and workforces. This allows for expansion of the domestic EV manufacturing sector and enhancement of local jobs and community benefits, while avoiding—and in some cases, redressing—the harms of poor industrial policies of the past. These grants are key to an EV transition that puts workers and communities first.

We discuss these programs in more detail below.

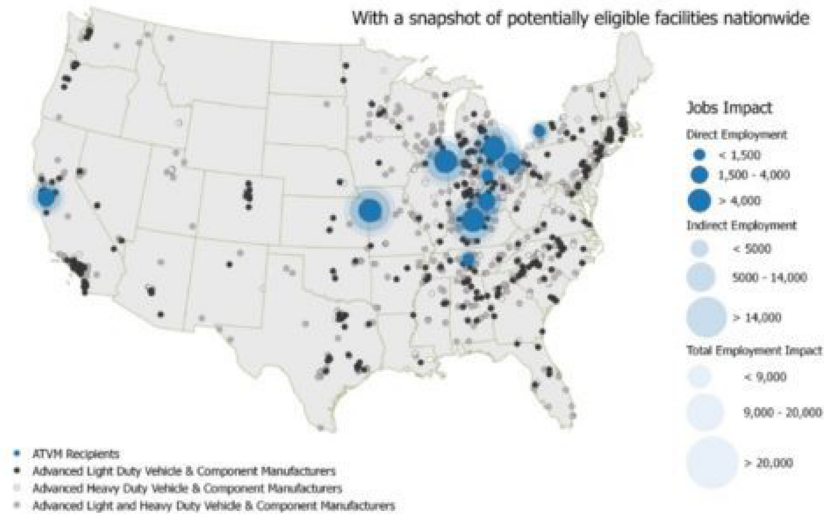
2. Could you please describe the types of policies and investments that could help expand, retool, and convert U.S. automotive and component manufacturing facilities to build advanced vehicles?

There are five principal mechanisms by which Congress can support manufacturing and good jobs all throughout the domestic automotive supply chain: the Advanced Technology Vehicle Manufacturing loan program (ATVM); conversion & retooling grants for recently-closed or at-risk facilities; the 48C Advanced Manufacturing tax credit program; production and investment tax credits for critical components in the EV supply chain; and labor standards, domestic content requirements, and equity provisions in EV deployment incentives. These mechanisms are described in detail below:

Fund the Advanced Technology Vehicle Manufacturing (ATVM) loan program at the Department of Energy to restore rescinded funds and expand existing authority to additional technologies, including medium- and heavy-duty vehicles, electric vehicle subcomponents, charging infrastructure, and other economically critical materials and technologies.

The ATVM plays a key role in spurring major auto and component manufacturers to locate their advanced vehicle and technology facilities in the U.S., rather than abroad, reducing risk as technology and markets shift. The ATVM has supported the establishment, retooling or expansion of domestic auto manufacturing facilities in eight states to build clean, fuel-efficient, and electric vehicles. The policy has sustained or created at least 35,000 direct jobs, and over 200,000 indirect jobs.ⁱⁱⁱ As the market accelerates toward EVs, the ATVM can again provide essential support for auto and manufacturing jobs throughout the supply chain, while facilitating vehicle emission reductions. Congress should at minimum replace the portion of ATVM funding rescinded in 2020, and increase funding to cover expanded program scope that includes medium and heavy duty vehicles and components manufacture, related electric charging and hydrogen fueling equipment, and other critical materials and technologies, which represent the key frontiers of advanced vehicle innovation. The ATVM is a high-impact program that, with comparatively modest additional federal investment, can enable tens of billions in manufacturing loans. The program demonstrates how centering manufacturing as an integral part of the nationwide vehicle transition can yield wins for jobs and the climate. With additional funding, the program could be utilized to spur investment across even more of the advanced transportation market and value chain. The broad impacts of past—and potentially, future—use of the program are illustrated below.^{iv}

Realizing the Full Potential of the ATVM: Past Employment Impacts and Future Opportunities from ATVM Expansion



Invest in Manufacturing Conversion & Industrial Retooling Grants to leverage the facilities and expertise we have today to build the clean vehicle fleet of the future.

The closure of manufacturing facilities can have widespread and lasting economic impacts on manufacturing communities, while undermining valuable manufacturing capacity, networks, and workforce capabilities. Manufacturing conversion and industrial retooling grants (such as authorized in Section 132 of the 2007 Energy Independence and Security Act) mitigate against this community devastation and costly economic disruption by directing investment to refurbish and retool recently-closed or at-risk facilities in the auto manufacturing sector. Conversion and retooling grants can play a key role in bringing new technology into existing facilities, and maintaining supplier networks and workforces. This allows for expansion of the domestic EV manufacturing sector and enhancement of local jobs and community benefits, while avoiding—and in some cases, redressing—the harms of poor industrial policies of the past. These grants are key to an EV transition that puts workers and communities first.

Robustly fund the 48C Advanced Manufacturing Tax Credit Program to support small- and medium-sized manufacturers that largely comprise the automotive supply chain.

The highly successful 48C tax credit program has a proven track record of enabling predominantly small- and medium-sized manufacturers to establish or expand domestic production of a wide range of clean energy and industrial products, including EV components and materials. With major increases in funding for these tax credits (and/or comparable grants) Congress can provide the necessary funds to establish or retool facilities manufacturing batteries, semiconductors, inverters, motors, and facilities that recycle critical minerals. 48C tax credits are also essential to spur manufacturing expansion in other critical clean technology sectors. These tax credits should prioritize distressed communities, including those that have traditionally relied on the fossil fuel economy for their livelihoods.

Fill domestic EV supply chain gaps through strategic manufacturing investment and production tax credits, among other potential measures.

The recent global semiconductor technology shortage, and its impacts on the domestic auto sector, illustrate how our reliance on a limited number of foreign suppliers for critical components can threaten our economic security. For the growing EV market, the challenge is even greater; the U.S. lags behind its competitors in producing central EV propulsion system technologies. Through a new manufacturing

investment tax credit (ITC) designed to fill economically critical supply chain gaps, Congress can provide key support to speed investment in establishing landmark production facilities, while a production tax credit (PTC) can aid in supporting the domestic scale-up of novel technology production. These investments will facilitate the national transition to EVs, protect and create high-quality jobs, build resilience and stability into the domestic EV supply chain, and ward off or reverse the offshoring of good jobs throughout the automotive supply chain.

Update and extend the 30D tax credit (as described in the Stabenow amendment) to incentivize strong manufacturing labor standards and support domestically manufactured EVs, and extend the 30B and 30C tax credits with labor standards and domestic manufacturing safeguards.

Ensuring our clean energy deployment tax credits are also updated to include labor and domestic content standards is also key to support and complement the protection and growth of domestic manufacturing and jobs.

By incentivizing vehicles assembled in the U.S. with greater domestic content, and vehicles built in union facilities, the consumer EV tax credit can help retain and grow the next generation of high-skill, high-wage, family-supporting jobs in the United States, while accelerating the domestic electric vehicle production and supply chain investment and growth necessary to secure long-term U.S. competitiveness in the automotive sector.

To maximize the equitable deployment of EVs, the credit should be made refundable, or ideally, available at the point of sale, and include an appropriate MSRP cap. Additionally, we should expand the reach of the EV tax credit to more consumers—particularly those who may not otherwise have been able to purchase and EV through the addition of a used EV credit.

Spurring domestic demand for EVs can and should boost American innovation, American manufacturing, and family-supporting, union jobs. Congress has the power to help ensure that American communities and workers can access the opportunities arising from this industry transformation, rather than facilitating the flight of good jobs to Asia and Europe, where key elements of the EV value chain are currently concentrated, and where policymakers are taking stronger actions to spur the production of key technologies.^v Our consumer incentives should reward increased investment in U.S. manufacturing and workers and the creation of good jobs with high labor standards in communities across America.

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